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**The Implicit Theories of Intelligence of English Adolescents
Identified as Gifted and Talented**

By

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Declaration

The author, Stuart Cadwallader, declares that this thesis has not been submitted for a degree at any other university and does not contain any work which has been previously published. A portion of the material regarding the epistemological framework of the thesis (**chapter I, p.24**) was adapted from an assignment previously completed by the author as part of a Master's degree in Educational Research Methods undertaken at the University of Warwick. However, this work was for assessment purposes only.

Abstract

An implicit theory of intelligence is a belief about the stability of intelligence – whether it is a fixed and innate trait (entity) or a malleable trait that can be manipulated through behaviour (incremental). Dweck & Leggett's (1988) model suggests that the theory which an individual holds can have a profound effect on their intrinsic motivation, achievement goals and academic achievement. Though there is support for this model in general, there is no conclusive evidence about whether it applies to the gifted and talented. This thesis tests the model with gifted and talented students quantitatively using a questionnaire (N=417) and explores the themes qualitatively with fourteen of these students using semi-structured email interviews. The data suggests that the theoretical framework does not fully apply to gifted and talented students. Two findings could explain this: a) participants showed high levels of motivation by endorsing both performance and learning goals b) the interview participants expressed quite complex beliefs about intelligence that defied categorization. Overall this thesis supports the need for a personalized approach to teaching the gifted and talented which allows them to maintain both positive performance *and* positive learning goals.

Chapter I: Introduction

The original point of interest that inspired the development of this thesis can be traced back to a discussion between the author and a 16-year old student who had been identified as ‘gifted and talented’ by his school. When asked whether he felt the term reflected his level of intelligence, the student replied ‘Oh, I’m not intelligent. I just work hard.’ This simple, perhaps modest, statement raises questions about what the term intelligence means to the individual and whether attitudes towards the nature of intelligence differ in meaningful ways. For example, how does an individual disaggregate natural intelligence (intelligence that is ‘gifted’) from high attainment gained through diligent hard work? Do beliefs about intelligence vary from person to person? If so, do these beliefs influence important factors related to achievement such as confidence and motivation? This spark of curiosity eventually developed in to this thesis.

This introductory chapter aims to provide the basic information needed for the reader to engage with the thesis as a whole by meeting three discrete objectives. Firstly, the main theoretical model that has informed this research is presented as part of an overview of the literature. Secondly, the concept of *gifted and talented*, which is used throughout, is defined and discussed. Finally, the epistemological approach that informs this thesis is discussed in order to express the author’s perspective to the reader.

Motivation and theory of intelligence – Dweck's model

Motivation

Before discussing the role of intelligence beliefs in detail it is useful to embed them in the broader concept of motivation. Covington (2000a) suggests that: “The concept of motivation stands at the centre of the educational enterprise” (p.171), but defining motivation is not a simple task. It is not something that can be easily measured, explored and fostered. Most teachers will probably tell you that it is impossible to teach a student who does not want to learn and that a large (and difficult) part of their job is motivating their class to engage with the subject.

Some students strive for academic success while others are apathetic but there are not always obvious reasons for these differing approaches. The solution to this quandary is likely to be highly complicated, involving the interaction of a vast number of social, psychological and environmental variables, many of which cannot easily be altered by policy, teachers or parents. In other words ‘motivation’ is unlikely to be a calculable parameter that can be ascertained using a formula – it is an umbrella concept that applies differently in each situation.

This assertion may make it appear impossible to use the concept of motivation as a basis for research, but in fact it could be seen as the top level of a hierarchy of concepts which could be useful for discussing what drives a student to work hard. There is an important distinction to be made between *intrinsic* motivation and *extrinsic* motivation – two concepts that could form the next level of this hierarchy. Intrinsic motivation comes from within: the individual is driven to engage with a task by psychological factors such as beliefs, values or long-term goals and the ‘reward’ for engaging in a task is inherent in the task itself. In

contrast, *extrinsic* motivation comes from the environment or social pressures: the individual is driven by rewards or punishments that are related to task success but may not necessarily be related to the task itself (Deci & Ryan, 1985).

Extrinsic rewards are fairly common in education. Prizes and material rewards are not uncommon both from the school and from parents, who may offer money or a gift for good educational performance. Good grades may also be considered to be an extrinsic reward as they can be used to access educational and employment opportunities. Covington (2000b) suggests that although extrinsic motivation can lead to increased effort and improved learning it is not as adaptable and therefore valuable as intrinsic motivation. He states that once extrinsic rewards are removed from learning situations then students who value them will show little inclination to continue working. He also suggests that personal interest, a source of intrinsic motivation, may be undermined by extrinsic rewards because the individual reasons: "If someone has to pay me to do this, then it must not be worth doing for its own sake" (p.23).

Despite this apparent conflict, Covington (2000b) suggests that intrinsic and extrinsic forms of motivation are reconcilable. For example, along with the extrinsic rewards, there can be multiple reasons for wanting to get good grades and some of these may foster intrinsic motivation. He also suggests that success can make learning more intrinsically satisfying and so motivation that is initially extrinsic (the need to get a good grade) can help the individual to develop intrinsic motivation (from the satisfaction of learning). Covington (2000b) believes that extrinsic and intrinsic motivations are not in direct conflict, rather that time

constraints on students result in extrinsic goals being prioritized. He suggests that focussing academic material on students' interests could bring the two forms of motivation together and prove highly beneficial.

Though extrinsic forms of motivation are clearly important, this thesis focuses on beliefs and attitudes and thus intrinsic motivation is more relevant. A review by Wentzel (1999) describes a possible source for intrinsic motivation. Wentzel (1999) suggests that elements of intrinsic motivation probably stem from socialization; a process whereby individuals process the beliefs and values being transmitted to them by society, family, peers, the media, and other sources and internalize this input. If such beliefs and values are internalized they become the individual's own and therefore a possible form of intrinsic motivation. This perspective is potentially useful because it means that if certain beliefs and approaches can be made salient enough to a student then this may lead to the internalization of constructive motivational components. This internalization could in turn lead to the student developing beliefs which provide a significant source of intrinsic motivation and could create a positive learning cycle.

There are many core beliefs and attitudes that may be important for intrinsic motivation but this thesis is particularly concerned with a certain type, specifically students' implicit beliefs about intelligence – their 'theory of intelligence'.

Dweck's research (see Dweck, 2000) has found that such intelligence beliefs are related to the academic goals that an individual adopts, and that this in turn has significant consequences for educational attainment. This section will now turn to

Dweck & Leggett's (1988) and Dweck's (2000) model of intelligence beliefs and achievement goals, the framework on which this thesis is largely based.

Implicit Theories of Intelligence

The term 'intelligence', so regularly used in everyday discourse, is actually quite ambiguous and is often interpreted differently in different countries and cultures (Demetriou & Papadopoulos, 2004). Although it is generally agreed that people of high intelligence have a greater capacity for learning, reasoning and understanding than others, the processes and structures underlying this capacity are unclear. The notion of intelligence as a single cognitive parameter, often referred to as the 'G' factor, was first introduced in the early 20th century by Spearman (1904) and, though declining in popularity (Furnham, 2000), is still in use in some of the literature (e.g. Colom, Jung & Haier, 2006; Rindermann, 2007).

Gardner (1983) brought to the fore the concept of multiple intelligences, suggesting that there are eight discrete domains of intelligence. These domains range from the more accepted cognitive intelligence types (e.g. logical-mathematical intelligence) to more artistic forms (e.g. musical intelligence) and social forms (e.g. intrapersonal intelligence). Sternberg (1985) has also developed a theory of intelligence - a triachic model comprising analytical (sometimes called componential), practical and creative (sometimes called experiential) elements. The analytical element is similar to the psychometric definitions of intelligence that stem from the 'G' factor approach and involve analytical and problem solving skills. The practical element is based on how an individual deals with the world around them and is therefore highly contextual. Finally the creative element refers

to an ability to synthesise internal functioning (cognitive processes) and external stimulus from the outside world in order to behave creatively.

The above examples are *explicit* theories of intelligence, but this thesis is interested in *implicit* theories of intelligence. Sternberg et al. (1981) define implicit theories as:

...constructions of people (psychologists or laypersons) that reside in the minds of these individuals. Such theories need to be discovered rather than invented because they already exist, in some form, in people's heads.

(p.37)

Implicit theories of intelligence are not what the experts think but what the average person thinks about the nature of intelligence. They are constructed by the individuals who hold them and can therefore vary between people and groups. This does not mean that people are ordinarily aware of their theory of intelligence as most individuals are unlikely to think about intelligence in such a general and abstract manner unless explicitly asked to reflect on their intelligence beliefs. Theories of intelligence can filter through to influence behaviour whether the individual is aware of their initial beliefs or not.

The drive of this research is to understand individuals' attitudes and the impact that these attitudes have on academic performance and for this reason it is not necessary to engage with the complicated debate about explicit theories of intelligence to a substantial degree. Instead the focus will be on the exploration of how an individual's own beliefs about the nature of intelligence can influence their educational attainment. This issue is arguably of more practical value in the

classroom given that few students and teachers have time to read the literature on intelligence and synthesise the findings to inform their own beliefs and attitudes. The true nature of intelligence is still in debate but how the average person constructs the concept of intelligence and how their concept impacts on their everyday behaviour is important.

Based on the notion that implicit theories of intelligence are individually constructed, Dweck (2000) suggests that most people hold one of two internally-valid belief systems about intelligence: a) that intelligence is a fixed stable trait (an *entity* theory), or b) that intelligence is malleable and dependent on effort (an *incremental* theory). To elaborate, an *entity* theorist believes that an individual is born with a certain level of intelligence that does not significantly change throughout the life course – they believe that people may be able to gather more knowledge but their cognitive abilities will never substantially improve or worsen. This is essentially the ‘nature’ standpoint of the nature/nurture debate, reflecting a belief that intelligence, like most other traits, is largely stable and innate, a result of an individual’s genetic code.

An *incremental* theorist takes the opposite view, essentially adhering to the ‘nurture’ standpoint. For the *incremental* theorist a person is born as a ‘blank slate’ and their environment, along with how the person interacts with their environment, dictates the level of intelligence that they develop. From this perspective intelligence is fluid; changing with experience. Dweck (2000) suggests that the theory which an individual holds can have a profound affect on their approach to education and their academic goals. Implicit theory of

intelligence is the subject of a small but substantial body of research and this literature is the focus of this thesis.

Theory of intelligence and achievement goals

Taken out of context it is not immediately apparent how theories of intelligence impact on motivation but Dweck (2000) suggests that intelligence beliefs are essential components of 'achievement goals' (Dweck & Leggett 1988; Hong, Chiu, Dweck & Lin, 1998). McClelland (1987) suggests that an: "achievement incentive is one in which a person gets satisfaction from doing something *for it's own sake*, or to show that he or she is more capable of doing something" (p.229). In other words achievement incentives are key drivers of intrinsic motivation. Achievement goals are derived from these incentives and are an individual's objectives in a given context where they may be able to accomplish something, be it a material reward or a psychological one. Ames (1992) states that achievement goals are a combination of cognitive and affective components that stem from the way an individual's beliefs (in this case about intelligence) interact with a given achievement context, such as the school environment.

It appears that achievement goals are a vital element for encouraging engagement with a task (Ames & Ames, 1984), while McClelland (1987) suggests that the need for achievement can generally be a very powerful motivator for human behaviour and so the specific goals of an individual can be paramount to motivating positive behaviour. The overall picture starts to develop here: implicit theories of intelligence influence achievement goals, achievement goals influence implicit motivation, and motivated individuals are more likely to perform well and

achieve academically (e.g. Elliot & Dweck, 1988; Fortier, Vallerand & Guay, 1995; Gottfried et al.; 2007).

This raises a question about *how* beliefs about intelligence influence a person's achievement goals. Dweck (2000) suggests that students who are *entity* theorists are more likely to hold 'performance goals' meaning that their main aim is to succeed comprehensively on any task that they are asked to perform. For such students the purpose of completing a task is to demonstrate their aptitude and intelligence and so they aspire to complete work quickly and easily. *Entity* beliefs are linked to performance goals because a belief that intelligence is fixed drives the holder to want to discover what their own level of intelligence is. A task or challenge is therefore viewed as a way of validating personal intelligence levels, of socially or personally demonstrating an acceptable or superior level of intelligence (Dweck & Leggett, 1988).

In contrast, *incremental* theorists tend to have 'learning' goals. For them, tasks provide an opportunity to develop new or existing skills and to gain new knowledge. Learning goals are associated with an incremental theory because the holder believes that, by taking opportunities and working hard, intelligence can be improved and therefore tasks and challenges provide an opportunity to increase intelligence (Dweck & Leggett, 1988). Incremental theorists are therefore more concerned with learning from a challenging experience than performing flawlessly. Dweck & Leggett (1988) break down the relative impact of holding a performance goal compared to a learning goal in to three key areas: *Cognition*, *affect* and *behaviour*.

Cognition:

With regard to cognition they suggest that:

...performance goals create a context in which outcomes (such as failures) and input (such as high effort) are interpreted in terms of their implications for ability and adequacy. In contrast, learning goals create a context in which the same outcomes and input provide information about the effectiveness of one's learning and mastery strategies. (p. 261)

For those holding a performance goal high effort implies low ability regardless of whether or not the task is successfully completed. High ability is only implied when they meet with success despite low effort. The student with the learning goal holds a very different cognitive scheme - effort and ability are positively related. By expending effort they are expanding their ability.

Affect:

With regard to affect, those with a performance goal who experience failure or exert excessive effort often feel that they have low ability, which can damage self-esteem. Alternatively they may adopt a defensive position, devaluing the task and expressing boredom or dislike towards it (Diener & Dweck, 1978; 1980). For those with a learning goal, failure simply implies more effort or a change in strategy is necessary and so does not have a negative impact on self-esteem. In fact, the opposite may occur

in some cases because positive affect, such as pride and satisfaction, can be gained through overcoming challenges.

Behaviour:

Finally, behaviour can also be altered by an individual's achievement goal.

Those with a performance goal may have a tendency to avoid tasks that they perceive as potentially challenging in order to minimize the risk of encountering failure. They are cautious and try to avoid anything that might overstretch them and therefore cause them to question their level of intelligence. Individuals with a learning goal may exhibit the opposite behaviour. The learning goal drives the individual to gain new knowledge (and to seek the satisfaction of doing so) and so orientates them towards novel and challenging tasks. They do not fear intellectually challenging situations and are often drawn to them.

Dweck & Leggett (1988) suggest that there is a tendency for an individual with a performance goal to believe that the more effort they expend the less ability they possess – they call this the 'inverse rule' (p.262). They note that there is a conflict within this rule – how does the individual decide the minimum effort necessary on a simple task in order to demonstrate high ability? There is a certain amount of effort necessary to demonstrate high ability through performance in the first place. Effort is therefore only expended when the individual is of the belief that the task is achievable and is withheld when the task appears difficult. Ironically this is when it is most needed.

The negative connotations associated with a performance goal discussed above have been shown to occur in some experimental studies (e.g. Dweck & Reppucci, 1973; Licht & Dweck, 1984; Thompson & Musket, 2005). Repeated failure can often lead to a ‘helpless’ reaction and a significant decline in performance (Eliot & Dweck, 1988). This decline occurs because the individual believes that a task in which they have previously been unsuccessful is ‘beyond them’ and so they cease to engage with it (Dweck, 2000). As a result, such students may try to avoid challenge and only attempt to complete tasks in which they are sure they can be successful, even ‘handicapping’ themselves with low effort or poor behaviour so that any failure is attributed to these factors rather than to low ability (Rhodewalt, 1994). Those with an incremental theory do not tend to respond helplessly to failure, they will simply try to overcome the problem by adjusting their strategy or increasing their effort (Eliot & Dweck, 1988; Butler, 1992). The helpless response is discussed further in **chapter II, p.35**.

Achievement

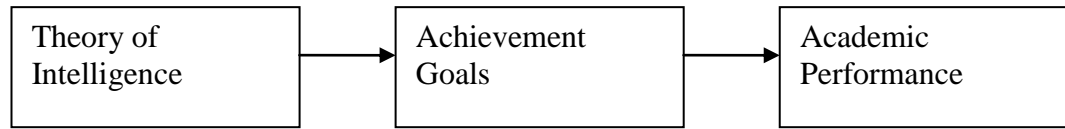
In the school context, an environment in which students are frequently asked to carry out tasks and are often assessed on their performance, academic achievement can often be highly emphasised. Often the requirement to perform successfully can be quite intense, taking the form of high stakes assessment that contributes towards a final grade. These grades can have a profound impact on the educational and employment options open to the student – good grades can mean access to university and college courses, can provide the opportunity of scholarships and apprenticeships and can allow the individual to be more competitive in the job market. The importance of achieving good grades during

assessment is impressed on students early; in fact English schools carry out more high stakes assessment than schools in most other European countries (Hall & Øzerk, 2008). Academic achievement is highly important in England and so identifying and studying attitudes that can influence it is a valuable endeavour.

Theory of intelligence has been linked to academic achievement in several studies. Blackwell, Trzesniewski & Dweck (2007) examined mathematical achievement in American 12-13 year olds and found that an incremental theory predicted an improvement in grades over two years while an entity theory did not. Aronson, Fried & Good (2002) taught an incremental theory to a group of African-American college students and found that they earned better grades than control groups in subsequent examinations. Ahmavaara & Houston (2007) compared students from selective schools and non-selective schools in England and found that achievement aspiration was predicted by theory of intelligence, school type and gender. These studies are discussed in more detail in **chapter II**.

In summary, Dweck & Leggett (1988) suggest that the selection of specific achievement goals by an individual is based on that individual's theory of intelligence and that these goals can have a significant impact on academic performance. This proposed relationship is expressed graphically in **figure 1**. This section has outlined the theoretical model that is the basis for this thesis. So far the model has been discussed in a relatively unproblematic manner but the research that supports and questions it will be discussed critically and in greater depth in **chapter II**. The next section of this chapter will define the concept 'gifted and talented' and explain its use within the thesis.

Figure 1: Dweck & Leggett's (1988) model of how theory of intelligence influences academic performance



Gifted and talented – a definition

It is important to establish the key concept of ‘gifted and talented’ because it is controversial and will be used throughout this thesis. This section acknowledges some of the issues with the concept and the weaknesses in the assumptions that underlie it. Some background information about the population used in this research and the practicalities that have shaped both the definition and the selection of the sample will also be provided.

‘Gifted and talented’ is a term widely used in educational policy in England. The term conjures images of students at the very highest echelons of ability but it does not, on its own, provide precise details about the ability range encompassed. The precise definition of the phrase has changed on several occasions since its introduction into policy, but in 2008 the Department for Children, Schools and Families (DCSF) (2008a) offered a working definition of gifted and talented students as:

Children and young people with one or more abilities developed to a level significantly ahead of their year group (or with the potential to develop these abilities). (p.1)

On the surface this statement is reasonable but closer inspection reveals that it fails to provide a precise definition. For example how should the reader define the word ‘significantly’? Does the child need to be head and shoulders above his peers or simply within the top ten performers? Does comparison within the year group encompass only those in the school or those in all schools throughout the country? The term ‘abilities’ is also ambiguous – it may refer to specific

performance in discrete academic subjects or it may encompass broader abilities, such as social skills, that lie outside of the subjects regularly taught in school.

The distinction between a 'gift' and a 'talent' is also unclear. The DCSF (2008a, 2008b) states that *gifted* learners are those that have ability in one or more academic subject while *talented* learners excel in practical domains such as sport, the arts and leadership. However the two groups that are independent in this definition do not appear to be treated any differently within the policy itself. Between 2002 and 2007 the National Academy for Gifted and Talented Youth (NAGTY) offered more precise parameters for identifying gifted and talented students (Campbell et al., 2004), suggesting that the most able 5% of the school population should be identified as gifted. These parameters were more precise but arguably rather spurious.

A precise definition of the term has in the past been available in policy but definitions are rather variable within the research literature. Often a gifted and talented student is defined by their academic abilities relative to other students such that the top 5% or 10% or 1% is defined as gifted. However, there is substantial variation in which of these rather arbitrary cut-offs is used and this approach tends to focus on general standardized cognitive ability tests or an aggregate of scores or grades from high stakes assessment (Strand, 2006). For example, Ablard (2002) uses students who had scored at or above the 97th percentile on a standardized achievement test, while Ziegler, Heller & Stachl (1998) used a cognitive test for quantitative ability and divided participants into average, gifted and highly gifted groups based on the results. Not only are

different tests and measures regularly used but also different criteria for categorizing the samples.

Sternberg (2007) states that the concept of giftedness varies between cultures, pointing out that giftedness is therefore contextual. His article challenges researchers in the field of giftedness to carefully consider contextual factors in their own work:

If we wish to identify the gifted accurately, we should put our own gifts on display. We should take into account the cultural contexts in which giftedness is socialized and nurtured. This does not necessarily mean constructing a different test for each child. It does mean understanding his or her performance as, in part, a function of the culture in which he or she was raised, and it means including assessments that enable each child to capitalize on his or her strengths and to compensate for or correct weaknesses. (p.164)

For Sternberg (2007) whether an individual is gifted and talented cannot be decided based on only the evidence of a single intelligence or cognitive abilities test. Giftedness can exist in a number of domains and is context sensitive.

The drive to explore giftedness in different domains stems primarily from the work of Renzulli (1976), Gardner (1983), and Sternberg (1985) and is a popular approach in England that has influenced educational policy (Campbell et al., 2007). Using this framework, it is possible to study giftedness in single or multiple domains – examining individuals that may be identified as gifted and talented in a particular academic subject. For example, Threlfall & Hargreaves

(2008) compared the problem solving strategies of gifted students and average students on a mathematical task, while Ngoi & Vondracek (2004) examined a case study of science education for gifted students in a single American high school. Whether gifted and talented students use different strategies or approaches for different subjects has also been explored: Li & Adamson (1995) compared gifted girls to gifted boys on a number of motivational measures within the specific academic domains of mathematics, science and English, finding that gifted girls reported greater confidence and interest in English.

The use of standardized tests or teacher nomination to identify the best students in a given school is another option, with some researchers selecting not to focus on the national context but on the school level. For example, Phillips & Lindsay (2006) used purposive sampling based on students identified by schools as the highest achievers in their year group. Teacher nominations have also been used to identify gifted students for research (Freeman & Josepsson, 2002), though there are question marks regarding how reliable and accurate teacher nominations are (Niederer et al., 2003). The ambiguities with regard to the concept of giftedness and how to define a gifted and talented student naturally develop into ambiguities with regard to how to identify a gifted and talented sample.

The identification process tends to be the key for defining the sample. Freeman (2005) notes that terms such as gifted, highly able and more able are often used interchangeably and that conceptions of the term gifted often vary substantially between countries. Borland (2005) believes that the "...concept of giftedness is incoherent and untenable on a number of grounds" (p.2), suggesting that it is a

questionable social construct that may actually have negative connotations for social equity. The differing definitions across and within literature on both policy and research makes using the term gifted and talented conceptually difficult. There is no way to use it without first deciding on a precise definition and having to work with the questionable assumptions that underlie that definition.

Another issue is that of how to differentiate provision in such a way to support both 'gifted' and 'talented' individuals. Neelands et al. (2005) review the provision and policy for talented students in England and suggest they are inadequately differentiated from gifted students. They suggest that policy and provision attempts to cater for gifts and talents across all domains in the same manner but that this generalized approach tends to favour academic gifts over vocational talents. They suggest a need to more precisely tailor support for the specific gift or talent:

There are now substantial sums of money being used to support talented young people, but there is a need to address the inconsistencies and inequalities between and even within different domains. (p.18)

They also suggest that for talented students the existing policy has an over-reliance on existing traditional educational structures which are comparatively exclusive and require financial and cultural capital to access. For example, dance and drama schools tend to be expensive and the competition for places and scholarships is fierce.

Taken together, the examples above demonstrate an inconsistent approach to conceptualizing the term gifted and talented, to identifying suitable samples and to

providing support. The definition chosen for this thesis matches up with the one that was used by the National Academy for Gifted and Talented Youth (NAGTY) between 2002 and 2007. This is a necessity because it is the NAGTY population that is sampled in this research. The practicalities of carrying out research have provided, or perhaps enforced, a preformed definition that is shaped by the policy and agenda of the English educational system. Given the theoretical assumptions that this sampling approach passes on to the research it is necessary to discuss NAGTY and the process by which the organization identified gifted students.

NAGTY was established to support the educational needs of students who perform, or have the potential to perform, within the top 5% of academic achievers in English secondary schools (aged 11-19). In order to achieve this, the primary objective was to initiate and support the integration of relevant pedagogy into the English school system as part of a model of gifted and talented education (see Campbell et al., 2004) which was introduced to deal with a lack of strategic policy for gifted education (Eyre, 1997). In addition NAGTY directly brokered a wide variety of opportunities and support structures for its members; including summer schools, day events, and online study groups and forums. Students were engaged in these activities to varying degrees, with some members not taking part in any of the activities and others becoming highly involved (Muijs et al., 2007).

The academy had over 100,000 members by 2007. Students were between the ages of 11 and 19 and were identified via a range of criteria including high standardized tests scores (such as CAT or MIDYIS scores), teacher nominations, and evidence of exceptional achievement outside of the school. These selection

criteria were deliberately diverse as part of an attempt to include students from disadvantaged backgrounds who might have been less likely to demonstrate their high ability because of social and environmental constraints. By allowing students the possibility of displaying potential in a number of ways, not just through achievement measures such as cognitive test scores and national test levels, the academy strived to be more socially inclusive.

This approach was not without problems. Hartas, Lindsay & Muijs (2008) evaluated the identification procedure for NAGTY's first summer school and found '...a lack of clarity with regard to what giftedness entails and what counts as evidence of giftedness...' (p.16). Though not averse to the use of multiple criteria for identification of gifted and talented students they recommended more stringent guidelines and triangulation of different forms of evidence. Strand (2006) evaluated the identification system for NAGTY as a whole and criticized its validity on the grounds that it only tested eligibility at a single point in time, meaning that once students were enrolled their status as 'gifted and talented' was never again called into question. The assumption that giftedness is a rigid trait was being made without challenge. Strand (2006) also called for more stringent guidelines and the more proficient use of existing cognitive ability tests.

NAGTY no longer exists in the form that it did when the data for this study was gathered, though the principles for educating the gifted and talented in England remain very similar (Bailey et al., 2008). The infrastructure for delivering this provision has changed such that many activities are subcontracted to multiple providers by a managing organization rather than provided directly (CfBT, 2008).

The primary objective remains to identify gifted and talented students within the English school system and to add them to a 'gifted and talented register' (DCSF, 2008a). Identified students are still offered access to a range of extra-curricular activities and there is still a drive to arm their teachers with the necessary knowledge and tools to help them achieve their potential.

Bailey et al.'s (2008) review of gifted and talented provision in England generally supports the current system of providing the majority of support in mainstream school settings. However, the authors express some concerns regarding making generalizations about the gifted and talented and treating them as a homogeneous group. They suggest that:

There is an urgent need for funded research focused on English and UK educational settings. In particular, studies are needed that explore the distinctive needs of individual gifted and talented pupils, their social interactions and their pedagogies. (p.2)

Based on their review of the literature they clearly express the view that looking at the gifted and talented as a varied group with distinctive and diverse needs is necessary to best serve their educational needs. The Department for children, schools and families website (DCSF, 2008b) has pages about the gifted and talented which contain detailed information on policy and practice.

To conclude, the definition of gifted and talented in this thesis has a basis in the NAGTY organization's multi-domain top 5% criteria, but that does not suggest that the definition is not flawed. NAGTY was an organization with a practical and political agenda and when identifying potential members an overly rigorous

definition can be restrictive. The administration necessary for over 100,000 members requires flexible guidelines and allowing gifts and/or talents to be evidenced in multiple ways was in part due to political issues surrounding equity. This thesis must acknowledge the flaws and assumptions regarding the NAGTY conception of giftedness and how it was implemented and recognize how the definition varies in comparison with others that may be used to inform design, analysis and discussion.

These issues raise important questions about validity. This thesis aims to tackle these problems in the research design, countering them as far as possible by using relatively objective measures to check that the students were high achievers, exercising transparency about obvious conceptual assumptions and providing clarity with regard to the sampling process. This chapter will now explore how epistemological beliefs informed the methodology that was used for this research.

Epistemological foundation

An epistemology is a ‘theory of knowledge’, an understanding about the nature of knowledge and how it can be gathered. A researcher’s epistemological beliefs are therefore fundamental to how research is carried out and interpreted. The epistemological framework which guides this research will be made explicit, as this dictates the core assumptions underlying the method and analysis and so plays a key role for interpreting the thesis. Positivistic and relativistic perspectives will be briefly reviewed before discussing post-positivism and critical realism. How the epistemological framework influences the thesis in a number of key ways is discussed. This section will also include some information about the author.

A positivistic view suggests that all phenomena are observable and therefore knowledge can be gained through analysis of these phenomena (see Cohen, Manion & Morrison, 2000). Mouly (1970) postulates that there are five steps to inquiry and that the final one is an approximation of the truth; suggesting that scientific methods allow researchers to gradually edge towards an understanding of the objective reality. This perspective generally favours the use of quantitative methods that allow phenomenon to be compared using standardized measures. This approach is popular in the natural sciences but has significant opposition within the social sciences given the pervading view that observable phenomena in the social world are socially and culturally constructed and therefore highly contextual and subjective (Beck, 1979).

An alternative position is a relativistic view which states that there is no ‘objective’ reality to observe or measure and that the tools of positivistic research

models are effectively socially constructed to fulfil a societal need, rendering them subjective (see Cohen et al., 2000). Relativistic epistemological approaches generally favour qualitative methods that draw out the depth and complexity of phenomena, using observation and social interaction to immerse the researcher into the context they wish to research. Such approaches are often criticised for being ungeneralizable and uncontrolled – focusing too heavily on single specific cases to have relevance outside of that situation (Bernstein, 1979).

Most researchers recognize the need to avoid being drawn too close to either of these two extremes. They usually take positions somewhere between the two, leaning towards one or the other and combining the methods that each implies (Muijs, 2004). The epistemological framework that guides this thesis also lies somewhere between these opposing positions and is most closely aligned with post-positivism and critical realism (Bhaskar, 1978). Davidson & Layder (1994) suggest that:

It is essential to recognise that empirical observations are not the be all and end all of scientific research, and that a commitment to natural science methods and procedures does not offer the final, ultimate, reliable and objective way to obtain knowledge, without abandoning all belief in reality or all hope of advancing human knowledge. (p.26)

This implies that positivistic and relativistic paradigms are not necessarily oppositional and that a degree of common sense can dictate the approach and methods that a researcher applies to solve a given problem. Indeed, the flawed natures of the purely positivistic or purely relativistic epistemological approaches

have long been debated and the perspectives of post-positivism and critical realism have grown from this malcontent (Robson, 2000).

Post-positivism focuses on probability and confidence levels in its handling of quantitative data (Muijs, 2004). This is common in research dealing with education, psychology and other social sciences and works on the principle that although universal laws may exist in complex social situations they cannot be conclusively proven. It is however possible to identify trends and even to estimate probabilistically the chance of a certain phenomena occurring if enough is known about other variables (Muijs, 2004). Robson (2000) describes post-positivists as the heirs of positivism but suggests that:

Post-positivist researchers can be viewed as recognizing, sometimes reluctantly, that the battle for positivism has been lost, but as still hankering after the mantle of respectability and authority that it conferred.
(p.27)

It seems that post-positivism is similar to positivism but without the latter's sense of confidence and conviction.

Another epistemological approach, 'Critical realism', which is derived from realism, perhaps provides a better way of legitimizing the use of quantitative methods. The critical realist asserts that the real world does exist outside of the individual human experience but also that perception and cognition influence how it is interpreted (Sayer, 2000). The lack of universal laws (rules that apply in all circumstances) in the social sciences (and indeed education) fits in with this conception neatly because the uncertainty in existing theories stems from the

complexity of the varying perceptions, interpretations and behaviours of people. There are a myriad of variables present in any given social situation all of which can be viewed at different levels and from different perspectives. For example research on pedagogy can be approached from the perspectives of teachers, pupils, parents, or politicians, and each of these perspectives can be explored at the national level, school level, classroom level or individual pupil level, to name but a few possible combinations.

At first glance this may appear intimidating rather than helpful but in fact it can be seen as a pragmatic perspective because it has provided a middle ground from which social research can move forward. As Robson (2000) discusses, a critical realist researcher will view the world in terms of *outcomes* from *actions* and explores the *mechanisms* that mediate this process in various *contexts*. The words in italics provide four points in the research process that can be explored and even manipulated by the researcher – for example how does a given *mechanism* and *context* influence or mediate the *outcome* of an *action*. This is far less linear than the simple cause and effect model which positivism, and to an extent even post-positivism, utilises because it is far more open to dispute and expansion and more capable of examining a given situation at a variety of levels to produce multiple possible explanations (or *mechanisms*) for social events.

This approach does not lean towards either quantitative or qualitative methods. A critical realist whose research uses a quantitative approach can adapt the epistemology's assumptions and become much more tentative and reflexive when interpreting data (Cohen et al., 2000). Likewise, qualitative methods can be used

to explore phenomena at any of the four points in italics listed above. It is important to be aware of the strengths and weaknesses of an approach and the degree to which it may or may not entirely reflect the reality of a situation. Quantitative research is not inexorably tied to a positivist perspective and it is quite possible to be aware of the attributes of a method that collects a certain type of data and so be careful and accurate with its interpretation.

As noted by Bryman (2001) it is also easy to be seduced by numbers and get a “...spurious sense of precision and accuracy” (p.77). It is equally as easy to be absorbed by a single well-written case study and allow it to unduly influence perspectives and even decisions for action. In fact, a case study could be better seen as enriching and giving meaning to a broad trend suggested by a survey. Equally a theme that is apparent in a case study can be explored on a larger scale through the use of quantitative data. Research is about the quest for knowledge and meaning and by combining methods that look at a situation in both breadth and depth it is easier to see the bigger picture and gain a more detailed and complete understanding. Bryman (2001) suggests that researchers require a:

...growing preparedness to think of research methods as techniques of data collection or analysis that are not as encumbered by epistemological and ontological baggage as is sometimes supposed. (p.454)

In other words researchers must view quantitative and qualitative methods as tools for looking at different levels of a problem and learn to use the most appropriate tool or combination of tools for each job.

The critical realism perspective seems to recognize the strengths and weaknesses of positivism and relativism and reconcile them to a degree while offering a flexibility of approach that allows the correct methods to be applied to each research problem. The exploration of these epistemological positions and the recognition of critical realism as a viable epistemological perspective to inform research will influence this thesis in four key ways: concept, method, and analysis/interpretation. Each of these will now be discussed in turn:

Concept

Conceptually, Dweck & Leggett's (1988) framework appeals because it is elegantly logical and has face validity. Many psychological theories can appear overly complex or abstract – breaking down human behaviour into components and contrived flow charts that do not seem to relate to actual thought processes. This framework is relatively simple and appears genuinely relevant to human experience (ecological validity), yet there are clear and statistically reliable measures for quantitatively approaching each component. It does not attempt to be comprehensive, allowing it to be approached flexibly with an appreciation of the role of context and confounding variables.

Method

Critical realism allows research problems to be explored from different perspectives. Although statistical analysis of data from multiple participants provides a core part of this research, this 'macro' view will be complemented by a more nuanced 'micro' view that examines single cases

in an effort to contextualize the issues and recognise the complex interactions between variables that may occur. By focusing not just on data taken broadly from a large and varied population but also on data from individual cases a balance between external, internal and ecological validity can be found that produces findings that are scientifically sound and meaningful.

Analysis and interpretation

The different forms of data can complement one another when approaching research from a critical realist's perspective. Analysis of quantitative data from larger samples can be used in conjunction with rich qualitative data at the individual case level to understand general trends in a population along with the processes and contexts that may cause outliers or divisions within the population. Analysis at each level of the problem can be interpreted together to gain a deeper and more valid understanding that will allow more measured conclusions to be drawn.

This epistemological discussion frames the aims and method of this research project but it does not yet address the subjective influence of what is probably the most substantial component of any doctoral thesis: the author. It is important for the reader to be aware of the background of the author when interpreting a piece of research. Although every effort has been made to be objective and transparent it is inevitable that the personality and background of the researcher greatly influences the thesis from start to finish, particularly with regard to the choice of topic and the interpretation of findings. The selection of the topic stems from the

author's interests, the epistemological approach and methodology from their academic experiences and the interpretation is influenced by their values and research skills.

The author attended a comprehensive school in southern England before studying Psychology at undergraduate level. The author is male and his father is a primary school teacher. These points could have an impact on the stance taken towards teachers during the interpretation of data and no doubt influence attitudes towards educational policy and practice. The experience of watching his father work hard and take on the burden of nurturing individuals through their formative years has lead the author to believe that teachers are underpaid and undervalued and this family background may subconsciously bias the interpretation of literature and data in a way that is favourable towards teachers.

Having spent two years as a research student at NAGTY (while undergoing training in educational research methods) the author had many colleagues involved with gifted and talented education and as a result may have become sympathetic to NAGTY policy and practice. The author may also be sympathetic towards the needs of gifted and talented students as a result of working closely with student members of NAGTY during the period of his PhD. These points do not aim to undermine the author in any crucial way or to suggest an inability to be critical or to approach research carefully and objectively, but any potential biases should be made explicit for the sake of reflexivity and transparency.

This chapter has introduced the core ideas of this thesis and framed them within a set of definitions and an epistemological perspective. There are certain fundamental issues that arise with all research because certain assumptions are always made and the author's own personality means that he or she cannot reach purely objective conclusions. It is important that these issues are tackled as reflectively and transparently as possible and, although providing this background information for the reader cannot neutralize these problems, acknowledging them enhances the thesis by exposing potentially ambiguous assumptions.

In order to set the scene this chapter has only briefly dealt with the literature and has done so in a way that is largely uncritical. The next chapter of this thesis builds on this foundation and takes a more in-depth view of the relevant research into Dweck's model and the areas of theory of intelligence, achievement goals and gifted and talented students.

Chapter II: Literature review

This thesis is intended to be exploratory at one level as it is using an established theoretical model to explore a specific population in an attempt to ascertain which parts of the theory work and which do not for this group. Another objective is entwined with this but more specific - to evaluate the theoretical model and its components. The first chapter of this thesis outlines the model and presents the context from which to understand the thesis (**see p.2**) but it deals with the material in a broad and mostly unproblematic way. This literature review takes a more detailed look at the research underpinning the model in a critical manner and also discusses the relevant nuances of the literature. A relatively diverse literature review is required to encompass the necessary research from a variety of disciplines - this chapter divides the literature into manageable subsections before drawing them back together and highlighting the more holistic perspective that is taken by the thesis.

There are five core areas which are discussed. The first of these is about theory of intelligence, specifically how it has been conceptualized and measured, while the second gives the same treatment to achievement goals. The third section examines the literature surrounding Dweck's model from two angles; what experimental and longitudinal evidence supports and challenges it and whether causal interventions that target certain components have been shown to have an impact. The fourth section examines the relationship between the model and attribution, confidence and self-concept. These variables are important because of their relevance to intrinsic motivation and the possibility that they may have a

mediating effect on the theoretical model. In the fifth section the literature on theories of intelligence and gifted and talented students is handled in greater depth along with more general research on motivation in the gifted and talented. Finally, these five strands are brought together and focussed into an overall research design as part of a final section that also presents a rationale for the research and a set of specific research questions.

Conceptualization and Measurement of Theories of Intelligence

Conceptualization

The definition of theory of intelligence is handled in **chapter I (p.6)**, but it is important to analyse how it was developed and how it is commonly measured. It was research in to ‘learned helplessness’ that first brought theory of intelligence to the fore. The concept of learned helplessness has roots in research on mental health (Seligman, 1975) and has been adopted to describe a tendency for some children to disengage with a task because of a belief that the outcome is not contingent on their behaviour. Dweck & Reppucci (1973) elaborate:

...a child might perceive independence between his response and failure by attributing the outcome to the influence of some external agent; he might perceive independence between his response and outcome by attributing the outcome to his inability to perform the response, whether this is true or not. In either case, he views the situation as being beyond his control. (p.110)

Dweck & Reppucci’s (1973) study found support for this type of helpless reaction. Forty American 10-11 year-old students were given solvable problems by one experimenter (success experimenter) and problems that could not be solved by a different experimenter (failure experimenter). The order in which each participant received these problems was random to begin with but after several rounds of testing the problems presented by the failure experimenter became solvable. Despite this change many of the participants still failed to solve the (now solvable) problems presented by the failure experimenter, though still being able to solve similar problems that were presented by the success experimenter. They

had effectively 'learnt' to fail in the presence of the failure experimenter and were not engaging with the tasks that were presented by this particular individual. The same study also recorded participants' attributions for success and failure using an 'intellectual achievement responsibility' scale and found that those participants who suffered the largest decrements in performance either took little personal responsibility for their actions or attributed any failure to their own lack of ability. In contrast, the more persistent (mastery orientated) participants stated that their own effort and perseverance was the reason for their eventual success.

Diener & Dweck (1978, 1980) performed a similar study, analysing the comments and attributions of American 9-10 year-olds who were experiencing the helpless reaction following failure on a card stimulus task. As in Dweck & Reppucci's (1973) study, these students had a tendency to attribute failure to lack of ability or lack of intelligence. They focussed on this as a cause for their unsuccessful attempts rather than focussing on overcoming their difficulties and trying to achieve success. The mastery orientated participants (those who persisted despite failure) made fewer attributions overall and expended more time and effort on developing strategies to overcome their difficulties. They were focussed outward towards the task rather than inward towards their own process of attribution.

The potentially negative impact of the helpless response to failure in academic contexts was of concern in the field and it was necessary to ascertain why some students reacted helplessly while others adopted a mastery approach.

Achievement goals were introduced into the research designs in an effort to try to answer this question (Dweck & Elliott, 1983). Performance goals and learning

goals (**see chapter I, p.9 for a definition**) were linked to helplessness such that performance goals were shown to create a vulnerability to the helpless response while learning goals fostered the mastery orientated approach (Dweck, 1986; Elliott & Dweck, 1988).

Elliott & Dweck (1988) asked 10-11 year old students to perform a pattern recognition task and manipulated two key variables: achievement goals & ability feedback. The task instructions were designed to either encourage a learning goal or a performance goal while students were given post-task feedback that stated that their current ability was either high or low. The results showed that those students in the 'performance goal/low ability' condition displayed poorer strategies in comparison to their first attempt when asked to repeat the task. They also suffered from negative affect, blaming their own insubstantial level of ability for their poor performance. They exhibited a helpless response – believing the task was too difficult for them they became negative and essentially gave up.

Those whose primary goal was to learn did not particularly care about whether they were successful or not – if they were challenged then they were learning and therefore happy to expend effort until they mastered the problem. In contrast, those with performance goals became despondent following failure because they had already failed their objective to perform well. They felt incapable and therefore incapacitated with regard to their achievement goal (Dweck, 2000).

The full theoretical model used in this thesis was completed through the introduction of theories of intelligence by Dweck & Leggett (1988). Having

reviewed the literature on individual attitudes towards intelligence (Sternberg et al., 1981) and the findings about the relationship between individual attitudes towards ability and achievement motivation (Nicholls, 1984), they suggested that differing core beliefs about the stability of intelligence were likely to be the root of differing achievement goals and subsequent helpless or mastery-orientated behaviour. Dweck & Leggett (1988) created the terms ‘incremental’ and ‘entity’ to describe the two types of theory of intelligence that emerged from their research and demonstrated that those with an entity theory were more likely to adopt performance goals and incremental theorists more likely to adopt learning goals (see **chapter I, p.9 for more on this**).

According to the model an individual’s overarching beliefs about intelligence influence the achievement goals they adopt and thus their subsequent achievement behaviour. It could be suggested that the model was developed *backwards* from the starting point of attempting to explain why some students exhibit a helpless response and others a challenge mastery response. This is not necessarily problematic but it does raise an issue about whether the research into intelligence beliefs is disproportionately based on the comments of the students in the original studies on helplessness (Dweck & Repucci, 1973; Diener & Dweck, 1978; 1980).

This is not a criticism as such. Most theories and research questions are based on data and comments from individual or small groups of participants (including this research). However, it is also true that these isolated comments and single cases can cause research to develop in a given direction. Had the participants in the original helpless studies uttered something different while under careful

surveillance by researchers a different theory may have been developed that had different beliefs and attitudes at its core. For example, what if a helpless participant had attributed failure not to lack of ability but to not being allowed to work with their friends? Perhaps this would have meant that research would have moved towards the exploration of shared social goals rather than the development of an achievement goal based motivational model.

It is also important to note that many of the studies mentioned in this section employ experimental methods that use artificially created tasks. For example, the card stimulus task is used in much of the early empirical research on the helpless response but it does not have much resemblance to tasks commonly undertaken in the classroom. The necessity of controlling for a variety of factors in order to isolate the variables being examined can make these studies rather ‘sterile’ which could be problematic for the ecological validity of their conclusions. Arguably the types of task used in these studies rarely exist in ‘real life’ scenarios, and the highly impersonal feedback that is used to differentiate experimental groups (e.g. Diener & Dweck, 1980; Elliot & Dweck, 1988) does not occur. When these findings are applied to the average classroom, in which a myriad of variables affect a range of different activities, they may fail to translate.

This is not to suggest that theories of intelligence are not relevant to achievement behaviour in naturalistic contexts. Licht & Dweck (1984) found evidence in naturalistic settings to suggest that the helpless response was not a “laboratory phenomenon” (Dweck, 2000, p.10). They used a questionnaire to identify which participants were likely to exhibit the helpless response and which a mastery

response. They then devised new material for their sample of 10-11 year old American students to learn in class (via a work book) but manipulated the difficulty by adding deliberately confusing parts near the beginning of the work book for half of the participants. Each participant was then tested on the material (though the deliberately confusing material was not relevant to this test).

For the participants who viewed material that did not have a confusing section those students identified as helpless did not perform significantly differently to those identified as mastery-orientated. For the participants who viewed material that did have a confusing section those identified as mastery orientated did not perform any worse when compared to the participants who viewed non-confusing material. However, those identified as helpless that viewed the confusing material demonstrated significantly impaired performance. They had not persisted after their initial confusion, deciding to disengage from learning material that they perceived as too difficult for them. Although this study does not use actual academic achievement outcomes it does provide some evidence that theories of intelligence and the helpless response are important in class room settings (away from the 'laboratory').

There is also some evidence from recent questionnaire based research that supports the significance of theories of intelligence to achievement related variables (e.g. Ahmavaara & Houston, 2007; Blackwell, Trzesniewski & Dweck, 2007). This provides some triangulation of methods which supports the ecological validity of the model. However, there is a counter-point to this: it is arguable that Likert-type psychometric measures administered through surveys are also lacking

in ecological validity, requiring participants to deal with quite abstract concepts (intelligence is rather intangible, even to those who study it in depth) by agreeing or disagreeing on a scale that is devoid of any context that might anchor their decision. Theory of intelligence is commonly ascertained using a measure of this nature – it is worth discussing this measure, and other methods of measurement, in more depth.

Measurement

Although theory of intelligence had been measured previously using a survey that required respondents to agree or disagree with a set of statements (see Dweck, 2000 for a review) it was Dweck, Chiu & Hong (1995) who fully developed a Likert type scale for its measurement. This six-item measure is included in **appendix A**. The measure can be divided into two parts – the first three statements measure agreement with an entity theory while the level of agreement with items four to six exhibits an incremental theory. Dweck et al. (1995) recommend that only the first three ‘entity’ items are used for measuring theory of intelligence, suggesting that incremental theories are “highly compelling” (p.270) and cause participants to drift towards an incremental theory across items or even to contradict themselves. The notion that incremental items somehow bias response raises questions about the validity of the measure and whether the concept can be viewed as a polarity (incremental-entity).

Dweck et al. (1995) reference unpublished research by Henderson (1990) in which participants were asked to explain their answers to the three entity items after they had completed the measure. Those participants who disagreed with the

items gave clear incremental reasons for each answer, which suggests that the items are validly measuring an incremental-entity scale. This is certainly a positive finding but does not explain why incremental items are so desirable nor does it completely remove the possibility that incremental and entity beliefs may actually be independent. Though the data may be neater when only the three entity items are used, the fact that the data generated seems to change when incremental items are included in the measure does raise some theoretical questions that are not fully explored.

Not all studies use the three-item version of the scale – Blackwell, Trzesniewski & Dweck (2007) used the 6-item version for their longitudinal study and did not allude to an incremental bias. Theories of intelligence have also been described and measured in different ways by some researchers. Kinlaw & Kurtz-Costes (2007) asked their students (aged 4-10) to rate their agreement with each of two drawings - one of someone who “thought that a person could get smarter all the time” and another of someone who “thought that a person was a certain-amount smart, staying pretty much the same” (p.300). Dweck (2000) provides slightly different versions of the scale for children and adults while Stipek & Gralinski (1996) and Spinath et al. (2003) both developed their own items and measures which were similar to those used by Dweck and her colleagues.

Ablard & Mills (1996) developed a scale based on the slightly different concept of ‘intelligence malleability’, working on the assumption that incremental and entity theories are actually part of the same scale (malleability). These differences in measurement make synthesizing the overall picture more difficult. It may be that

each measure is actually recording a slightly different belief, even if these beliefs are conceptually very similar. This is a problem that is not uncommon in psychological research and though not a fundamental flaw does mean that interpretation needs to be careful and considered.

Conceptualization and measurement of achievement goals

Conceptualization

This thesis treats achievement goals as part of the wider model of theory of intelligence. However much of the research focuses only on achievement goals themselves and keeps them empirically separate from theories of intelligence (though that does not make the two concepts theoretically divorced). This section examines some of this literature, focussing particularly on the research on achievement goal structures and how they link to theories of intelligence. Achievement goals have been researched or used in many studies. Although original conceptions divided goals into *performance* and *learning* types, efforts to develop a more comprehensive taxonomy of goal types have lead to more variations (Elliot & Murayama, 2008). Various goal labels have been used and the same goal label is occasionally defined in slightly different ways between studies. For example, though this study has largely used the term ‘learning goals’, the terms ‘challenge mastery goal’ and ‘mastery goal’ are also popular in the literature, sometimes being defined as unique factors that are separate to learning goals and other times as different labels for the same factor.

Elliott & Dweck (1988) introduced performance and learning goals based on their research into helplessness but the concept has evolved since then. Perhaps the most significant development has been the trichotomization of the variable, initially introduced by Elliot & Church (1997). They suggest that performance goals can be broken down in to two further categories, namely *avoidance* and *approach* types. A *performance-avoidance* goal involves a student wishing to perform in such a way that avoids failure, causing students to withhold effort for

fear of failure and looking foolish. A *Performance-approach* goal is almost at the opposite end of this spectrum. Students driven by such a goal will seek challenge because it provides an opportunity for them to outperform their peers and demonstrate their superior ability.

The difference between these two types of performance goal appears to be mediated by variables such as self-efficacy, self-esteem and locus of control.

Those individuals who do not feel competent will be more likely to hold performance-avoidance goals because they will feel that they are more likely to fail when faced with challenging tasks. In contrast those students who are more confident but still hold performance goals are more likely to adopt performance-approach goals because they believe they will be successful on the task and thus demonstrate their superiority (Elliot & Church, 1997; Grant & Dweck, 2003).

This is an important distinction because it demonstrates the importance of other variables for mediating the effects on the model. Mediating variables such as competency beliefs, attributions and self-concept are discussed in more depth in a later section (p.78).

Leonardi & Gialamas (2002) support the need for two independent dimensions to performance goals (performance-approach and performance-avoidance) within the framework of the current model. Using a sample of 10-13 year-olds from a large city in northern Greece, they adopted a questionnaire method and used measures established in the literature to explore theories of intelligence, goal orientation, personal competence beliefs and academic performance in mathematics and language. Statistical analysis revealed significant relationships between the four

variables, demonstrating that achievement goals and perceived competence were important predictors of actual academic performance. Theory of intelligence was related to achievement goals as expected, with incremental theorists more likely to endorse learning goals and entity theorists more likely to endorse performance-approach and performance-avoidance goals. They suggest that ‘...goal orientations based on implicit theories of intelligence may be the root of adaptive or maladaptive patterns’ (p.288).

The above study does not use the same measure of implicit theories as other studies, opting for Stipek & Gralinski’s (1996) measure rather than Dweck et al.’s (1995), and it also focuses on a sample which may be culturally different from those used in the majority of the literature, but it still provides support for the relationship between theories of intelligence and goals. In addition, there is considerable further evidence that the distinction between approach and avoidance variants of the performance goal may be of some importance to the model. Elliot & Church (1997) found that performance-approach goals were linked to feelings of competency and were not detrimental to task performance. This finding is supported in several other studies (Elliot & Harackiewicz, 1996; Elliot, McGregor, & Gable, 1999; Darnon et al., 2007).

Based on this literature it can be suggested that performance-approach goals may not necessarily have negative educational consequences and may, in some circumstances, have a positive effect (Dweck, 2000). However, Midgley, Kaplan & Middleton (2001) suggest that care needs to be taken if drawing this conclusion, pointing out that many studies provide evidence that such goal

orientations have little impact (e.g. Kaplan & Midgley, 1997). They suggest that more research into what moderates the impact of performance-approach goals on achievement is needed. It may be that such goals can even have a negative impact, fostering maladaptive patterns under certain conditions. Linnenbrink's (2005) study provides some support for this assertion, finding that performance-approach goals were detrimental to task performance and were linked with increased anxiety about the test.

In addition to approach and avoidance variants of performance goals, *normative* goals have also been used as a separate goal variable. These goals are considered part of performance goals, the only difference being that they focus on a desire to perform well relative to other people (to peers for example) rather than to an absolute standard. Grant & Dweck (2003) use the following example from their measure: "...an explicitly normative goal would be: 'One of my major goals in school is to feel that I am more intelligent than other students.' In contrast, the goal item, 'It is important to me to validate that I am intelligent,' is not explicitly normative." (p.542). Grant & Dweck (2003) performed a factor analysis and demonstrated that normative goal items were distinct from performance goal items and that their measure of these goal types was internally consistent. Their initial measures also used separate items for *challenge-mastery* goals (wanting to overcome a challenge) and *learning* goals (wanting to learn from an experience) but their factor analysis did not distinguish these items leading to the conclusion that the two could be merged.

The achievement goals discussed so far could be described as rather broad and de-contextualized. Urdan & Schoenfelder (2006) have suggested that motivation is too often conceived as an individual difference variable when in fact a variety of situational factors have a massive influence on motivational engagement. They suggest that the importance of peer relationships are often underestimated both in terms of how goals are formulated and in terms of a hierarchy of goals, hypothesising that in some circumstances social goals can supersede academic ones. Urdan & Mestas (2006) interviewed 53 students and their analysis of the resulting qualitative data suggested that academic achievement goals can be held for a variety of reasons and hold different meanings to different students. The role played by different achievement contexts has also been explored. Elliott, Shell, Henry & Maier (2005) have demonstrated that introducing performance contingencies (where future success is based on immediate success) moderates the relationship between achievement goals and task performance, while Roney & O'Connor (2008) found that specific contextual task targets within broader achievement goal structures impacted on performance.

Other researchers have tried to take an even broader perspective. Dowson & McInerney (2003, 2004) took an inductive approach to motivation in students in Australia, developing their own measure of achievement goals. Cognitive, affective and behavioural components of students' goals were identified in a series of interviews and the evidence suggested that students' often hold multiple, hierarchically arranged goals that are in both academic and social domains. They suggest that viewing academic achievement goals in isolation from their social context may be problematic, negating an important part of the overall picture. The

above example serves to reiterate the complexities involved in human motivation and also highlight the fact that while broadly categorizing goals is useful it may also be a simplification. It is beyond the scope of this literature review to discuss non-achievement related goals in detail but, in order to appreciate the overall context into which the current model falls, it is worth being aware of their existence and potential importance.

Measurement

It is important to discuss how achievement goals are commonly measured. Elliot & Dweck (1988) did not measure achievement goals as such but manipulated them experimentally through the use of vignettes and task instructions. In other cases, as with theory of intelligence, achievement goals are assessed using Likert responses to a series of statements. The responses to the items for each achievement goal that is measured are collated and converted to a score which represents the extent to which the individual endorses that goal. Elliot & Church (1997) required participants to respond on a Likert scale of one to seven with their level of agreement to 18 statements, six for each of three goals: performance-approach (e.g. It is important to me to do better than the other students), performance-avoidance (e.g. I worry about the possibility of getting a bad grade in this class) and mastery (e.g. I want to learn as much as possible from this class). Grant & Dweck (2003) used this type of approach to measure an initial six types of achievement goal, though factor analysis later reduced this to four (**see p.47**).

Elliot & McGregor (2001) suggest a two by two achievement goal scale that features the commonly used performance-approach and performance-avoidance

goals, but also mastery-approach and mastery-avoidance goals (the authors refer to *mastery* goals instead of *learning* goals but their definition appears qualitatively identical, as is the case throughout much of the literature). They suggest that mastery goals can be divided in a similar way to performance goals based on whether the participant wishes to approach or evade the consequences of a task. Their analysis of 180 undergraduates found that the four proposed goals were indeed statistically separate and that each had distinct profiles in relation to exam performance and implicit theories (not specifically of intelligence but more generally about the stability of traits).

Elliot & Murayama (2008) suggested that there were some issues with Elliot & McGregor's (2001) scale regarding the way the way items were phrased. They redesigned the measure so that no items directly pitted one goal against another (suggesting that all achievement goals could be independently endorsed). They also amended some items so that they would more explicitly assess goals rather than concerns related to goals (for example, removing statements that start 'I worry that...' and replacing them with statements that start 'My goal is to...'). Their analysis of the new measure, based on data from 229 undergraduate students, lead them to conclude that the redesigned goal structure was valid and predictive of both intrinsic motivation and exam performance.

Elliot & Muruyama (2008) suggest that the problems that they address in their study also exist in much of the literature. These criticisms shed light on a common problem in survey research – the ambiguity of language. It is certainly reasonable to suggest that the items used in achievement goal measures are open to

interpretation. For example, the item ‘I worry about the possibility of getting a bad grade in my class’ (Elliot & Church, 1997) is technically measuring concerns about failing to achieve a performance goal rather than an explicit performance-avoidance goal. Some items also measure different levels of affect, using words such as ‘worry’ and ‘fear’ even though semantically they may refer to different magnitudes of anxiety. Elliot & Muruyama (2008) also point to examples of single items that combine *both* learning and performance goal elements despite attempting to measure just one goal type, as well as items that include normative elements when their target is not actually a normative goal.

These criticisms highlight the need for precise language, but they fail to take into account issues of ecological validity. Items measuring achievement goals that are exact and de-contextualized may appear abstract and irrelevant. For example, an item that reads ‘My aim is to avoid doing worse than other students’ (Elliot & Murayami, 2008) lacks context and does not differentiate approach and avoidance goals as clearly as it may first appear. An aim to ‘avoid doing worse’ could be construed as an aim of ‘wanting to do better’, which is an approach goal rather than an avoidance one. The distinction is difficult to make clear to the participant. The measurement of achievement goals will never be perfect because goals are essentially social constructs. How two people respond to a set of statements may correlate but this does not necessarily mean the concepts being targeted are identical in the mind of each individual. For this reason it could be argued that any measure that is shown to be reliable and able to make statistical distinctions between the targeted achievement goals is acceptable. Interpretation of such measures needs to be careful and considered.

Research using Dweck's model

Theory of intelligence, achievement goals and academic achievement

Several studies have examined Dweck's model by exploring the relationship between achievement goals and academic performance (e.g. Elliot, McGregor & Gable, 1999; Harackiewicz et al., 2002; Shim, Ryan & Anderson, 2008), with some also including theory of intelligence as a variable (e.g. Leondari & Gialamas, 2003; Blackwell, Trzesniewski & Dweck, 2007) and a few examining just the relationship between theories of intelligence and achievement (Henderson & Dweck, 1990; Gonida, Kiosseoglou & Leonardi, 2006). Such studies are discussed critically in this section with regard to how they support or undermine the theoretical model.

Henderson & Dweck (1990) examined the intelligence beliefs and academic achievement of American students as they made the transition to Junior High School (11-12 years old). Over the course of this year they found that those students identified as having an entity theory showed a significant decline in performance in relation to their class mates, while those with incremental theories showed the opposite pattern. Participants were then asked to articulate what explanations they would use if they were to receive poor grades. Those with entity theories were significantly more likely to say that they would doubt their own intelligence while those with an incremental theory were more likely to suggest that they would need to revise their study strategy or increase their effort. Theory of intelligence appeared to be influencing grades and this relationship seemed to stem from adaptive or maladaptive cognitions.

Dweck (2000) outlines unpublished research in which a similar pattern occurred. Despite no initial difference in grades between students identified as entity theorists and students identified as incremental theorists, over the course of the first year in Junior High school (11-12 years old) the performance of the entity theorists declined while that of the incremental theorists improved. These examples serve to demonstrate the impact that theories of intelligence can have on academic performance but it is important to consider their limitations. Firstly, participants in Henderson & Dweck's (1990) study made verbalizations based on hypothetical situations and their comments may not have reflected their actual behaviour. Perhaps more poignantly, both studies focus on a specific age group and the transition between schools as a key juncture where theories of intelligence begin to have an impact. It is possible that entity theorists 'recover' and improve their relative performance after their first year.

The above studies focus on theories of intelligence but others examine only achievement goals, choosing not to measure intelligence beliefs. Elliot, McGregor & Gable (1999) examined the relationship between achievement goals (as a trichotomy, including approach and avoidance goals), study strategies and exam performance in a sample of American college students. Their findings indicated that study strategies mediate the relationship between achievement goals and exam performance, with mastery goals predicting deep processing and persistence, performance-approach goals predicting surface processing and persistence and performance-avoidance goals predicting surface processing. Both mastery and performance-approach goals predicted better exam performance.

Several studies have taken a longitudinal approach. Blackwell, Trzesniewski & Dweck (2007) tested a longitudinal mediational model of the relationship between theory of intelligence and achievement outcomes, following 373 American students entering junior high school (aged 12-13 years) for two years. Along with other motivational variables, theory of intelligence and learning goals were measured and the participants' grades in a national standardized mathematics exam were used as the outcome measure. The achievement trajectories of participants with entity and incremental theories differed over the course of the two years such that, though initially the grades were the same, those of incremental theorists improved. Learning goals were shown to mediate the relationship between theory of intelligence and achievement but performance goals were not explicitly measured in this study. It would have been useful to confirm that learning goals were negatively related to performance goals and to ascertain whether they also mediate the relationship between theory of intelligence and achievement (as would be expected).

Shim, Ryan & Anderson's (2008) study also examined the longitudinal relationship between goals and achievement. They followed a sample of 588 American 11-13 year old students through 2 years, measuring achievement goals and academic achievement (using a grade point average). They modelled the development of achievement goals and their changing relationship with actual academic achievement across four time points. They found that mastery goals predicted positive patterns of grade improvement over time though not the initial baseline grade of the student, performance-avoidance goals predicted lower

baseline grades though not patterns of change over time and performance-approach goals predicted neither baseline grades nor changes over time.

Shim, Ryan & Anderson's (2008) study is demonstrative of the fact that achievement goals are rather fluid over time and therefore their influence on achievement is complicated. Each of the three achievement goals varied in importance over the course of just two years (in fact all three generally declined in importance) and their level at any one time point may lack predictive value. It would be interesting to see if theory of intelligence also fluctuated in harmony with goals over time or whether intelligence beliefs are more stable and provide the individual with their baseline levels of goal endorsement.

The situation is perhaps further complicated by the findings of Harackiewicz, et al. (2002). Their longitudinal study sampled American college students on a psychology course, recording their grades for the duration of their time at college along with their module choices as a measure of interest in psychology. They measured the participants' achievement goals in their first year and also collected their scores on standardized cognitive tests as a measure of initial ability. Their analysis revealed that mastery goals, performance-avoidance and performance-approach goals all predicted different outcomes. Performance goals (along with ability) predicted academic achievement but not interest while mastery goals did not predict achievement but did predict interest. There are limitations to these findings in that they deal only with college students and they assume achievement goals are stable over time, measuring them only in the first year. However, this

evidence suggests that learning goals may not be as important to academic achievement as the model would predict.

Leondari & Gialamas (2003) used correlation and path analysis to explore the model and also found that incremental theories *did not* predict academic achievement and that the effects of achievement goal orientations were indirect, operating through the variable of perceived competence. They suggest that gender, school level and perceived competence are far more significant for predicting achievement than either theory of intelligence or achievement goals. There are question marks over the measures used in this study - the scale for achievement goals was developed by the authors and this makes comparisons to the rest of the literature problematic. They also used Stipek & Gralinski's (1996) measure of theories of intelligence rather than the more commonly used Dweck et al. (1995) scale. Despite this issue the study does provide evidence that Dweck's model may not be relevant in all contexts.

The causality of the relationship between theory of intelligence, goals and academic achievement is questioned by Gonida, Kiosseoglou & Leonardi (2006) who tested three alternate versions of the model (**Figure 2**). A Greek sample of 187 participants took part in two tests which used the same battery of measures and were performed one year apart when participants were aged 10-11 and 11-12 years old. Cross-lagged regression analysis was performed on this longitudinal data and it was model 2 that held true – implicit theories of intelligence were a *consequence* not a predictor of exam performance. This finding undermines the model, suggesting that exam performance is used by participants as an indicator

of competence and therefore evidence to inform their theory of intelligence.

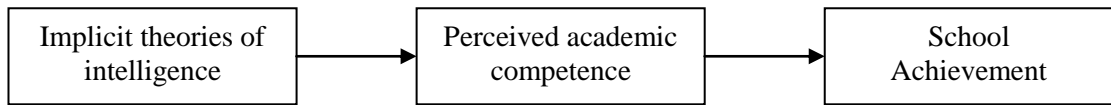
Theory of intelligence is altered by changing beliefs of competence and is therefore not the attitudinal starting point that influences goals and subsequent achievement behaviours that Dweck's model implies.

This finding raises significant questions regarding the validity of the model.

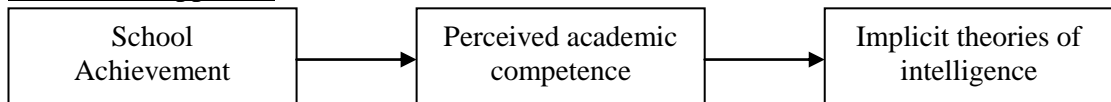
However, Gonida et al. (2006) point out some important limitations. Firstly, the design was rather short term, covering only a single year, and a design covering a longer period may reveal more complex interactions. Secondly, there may be significant cultural factors that influence the causality. They suggest that school achievement is highly valued among Greek students and their parents and that this may cause it to have a greater influence on beliefs about competence and intelligence in Greece compared to other cultures. In addition, achievement goals are not included in their research design meaning that it is not a direct test of the model being explored in this thesis.

Figure 2 Gonida et al.'s (2006) alternative causal models

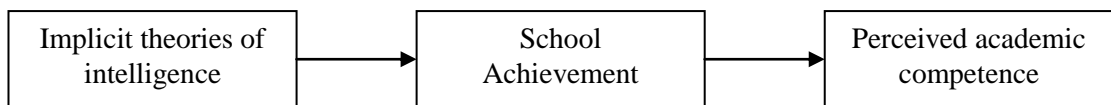
Model 1



Model 2 - Supported



Model 3



Other studies do support the causality suggested by Dweck's model. Shim, Ryan & Anderson's (2008) found that prior achievement did not predict achievement goal development (though their analysis did not include intelligence beliefs) and found that both achievement goals and theories of intelligence could be manipulated to influence grade. This process couldn't occur if achievement was causal of intelligence beliefs and/or achievement goals. Perhaps the conflict in findings is unsurprising in some ways. It seems likely that achievement and intelligence beliefs share a bi-directional relationship, with beliefs influencing behaviour but experience causing individuals to reconsider beliefs. Issues of causality are always problematic to decipher when examining statistical associations – many studies assume certain variables are causing a change in another but the direction is not always clear and likely to be bi-directional to a certain extent, even where longitudinal designs are employed.

Another issue that is important to discuss is the use of differing measures of academic achievement. Many studies discussed in this review employ exam results from specific standardized assessments in certain subjects (e.g. Blackwell, Trzesniewski & Dweck, 2007; Shim, Ryan & Anderson, 2008). This is certainly an ecologically valid way of recording actual academic achievement in the context of school life, but there are problems with this approach. Such standardized tests are culturally specific to their country of origin and tend to focus on certain age groups, which causes them to be in part defined by the educational policies and curriculum of that nation. Also problematic is the tendency for such measures to focus on a single academic subject which prevents the author from being able to validly generalize the findings beyond that one subject.

The use of generalized cognitive ability tests that purport to examine culturally neutral problem solving skills is not uncommon (e.g. Ziegler, Heller & Stachl, 1998; Harackiewicz et al., 2002). This approach is less idiosyncratic as it focuses on general ability but there are still likely to be substantial cultural differences that influence the scores between countries. In addition it is arguable that cognitive ability tests may not reflect actual school performance as they are somewhat abstract. In general, there is no consistent use of a single measure of academic achievement and this makes analysis across the literature difficult. These issues are also problematic with regard to the use of achievement data for identifying gifted and talented samples – the type of test used for sampling may have a significant influence on the data that is produced. Findings can be compared but only in a general and therefore somewhat limited way.

Overall, evidence for the model is not unanimously supportive. Many studies seem to endorse the importance of different mediating variables or use different types of outcome variable, which suggests that the simple structure proposed by Dweck is an over simplification. Despite this, the general framework does have some substantial support in the literature and it worth recalling that it was designed as a guide for research and therefore cannot be expected to fully account for the complexities of human attitudes and behaviour.

Manipulating the model

The studies discussed in the above section examine the relationship between theories of intelligence, achievement goals and academic achievement as a test of

Dweck's model. Alongside this it is also possible to explore the impact of manipulating the components of the model. Several studies have sought to combat the helpless response by manipulating an individual's theory of intelligence or achievement goals in order to encourage the development of learning goals and to improve subsequent performance. This section reviews studies that have tried to manipulate parts of the model in order to achieve positive educational outcomes.

When developing the achievement goal component of the model, Elliott & Dweck (1988) experimentally induced learning or performance goals and found that their manipulation had an effect on cognition; affect and behaviour but there was some evidence for the potential of *attribution training* even before this. In Dweck's (1975) study participants were given a problem solving task and were either given 'success training' (meaning that they never encountered task failure) or 'attribution training' that encouraged them to take responsibility for failure and to attribute it to inadequate effort rather than inadequate ability. When encountering failure on subsequent problem solving tasks, those in the success training group showed far greater declines in performance than those that received the attribution training. Success without challenge did not foster tenacity; it was the installation of an attitude which emphasised the role of personal effort. This intervention seemed to indirectly tap into theory of intelligence by emphasising the malleability of intelligence and the importance of effort over natural ability.

Based on this, Dweck (2000) suggests that feedback (specifically praise and criticism) that emphasises the malleability of ability and intelligence can prove motivating for students, while feedback that implies intelligence is 'fixed' has the

opposite effect (Heyman, 2008). In support of this, Kamins & Dweck (1999) have shown that praise and criticism have an impact on the helpless response in 5-6 year olds. Their study required participants to engage in role-playing activities in which they either encountered success or suffered a 'setback'. Each participant was then given feedback which was manipulated by the experimenter so to focus on *person*, *outcome* or *process* criticism. Participants were then asked to complete a follow-up task which, unbeknownst to them, involved a setback during which the participants' self-assessments, affect and persistence were recorded using a battery of questions and rating scales.

The results indicated that those participants who received an evaluation of their traits or abilities (*person* feedback) were significantly more likely to exhibit a helpless reaction when faced with a setback than those that had received feedback about their effort or strategy (*process* feedback) - they were more likely to suffer negative affect, evaluate themselves negatively and stop expending effort. Kamins & Dweck (1999) suggest that their study raises concern regarding the use of praise in the classroom: comments that focus on ability may boost confidence but they may also inadvertently encourage a tendency towards a helpless reaction. Again, this type of intervention indirectly influences the participant at the level of intelligence beliefs, with the precise nature of the praise or criticism being crucial. By emphasising an individual's effort over their ability the more adaptive incremental theory is encouraged which in turn leads to a greater endorsement of learning goals.

Although providing evidence for the malleability of intelligence beliefs and the causal impact they can have on achievement behaviour, this study has certain limitations. There may have been an issue with generalizability given the focus on a narrow age range of younger students as it is unclear whether such feedback would be equally effective with older students, whose attitudes and behaviour are arguably more engrained. Also questionable is the use of a role-playing task that involved participants using dolls to act out scenarios, rather than experiencing them personally. The children participating were not actually given the feedback *personally* – rather the *doll* was praised or criticised and the participant asked to role play reactions using the dolls. The study was conducted in this way so that the young students did not themselves feel criticised (an ethical concern) but it raises an issue of validity. The authors state that: ‘the scenarios were vivid, and all children felt, at some level, as though they were performing the task and receiving the feedback’ (p.837), but it is arguable that the responses did not authentically replicate how the child would react if the situation really did occur to *them*.

Research into interventions has also taken place with older participants. Hong, Chiu, Dweck & Lin (1998) performed a study that manipulated college students’ theory of intelligence. The intervention used two versions of an article about a gifted individual that differed only slightly so to either emphasise DNA and natural ability (an entity framework) or hard work and persistence (an incremental framework). Participants viewed one of these two articles as part of a reading comprehension test but the experimenters also manipulated the feedback such that participants believed that they had done relatively well or relatively poorly compared to their peers. The dependent variable was whether or not participants

agreed to take part in an extra tutorial that they were told could improve their performance on subsequent tests. When the feedback was positive such that participants felt they had performed relatively well, those that were presented with the 'entity' article were equally as likely as those presented with the 'incremental' article to agree to take part in the extra tutorial. However, when the feedback was negative those that were presented with the 'entity' article were significantly less likely than those presented with the 'incremental' article to take the extra class.

The results indicated that it is possible to influence students' theories of intelligence but also that task avoidance only seems to occur in individuals with entity theories if they believe that they are at risk of displaying ignorance. If they believe they are better than most of their peers than they are not worried about taking steps to improve, however if they believe they are worse they do not want to engage with the work any further - by taking this approach such students may be rejecting assistance when they require it the most (Dweck, 2000). Heyman (2008) has since found further evidence to support this in a sample 8-12 year olds, suggesting that interventions can be effective across a range of different age groups. It appears that manipulating behaviour through core beliefs about intelligence is possible and can have a significant impact. Dweck (2000) argues that praising students for their intelligence instead of their effort can have negative connotations. Although praise may boost self-esteem it may also foster an entity theory which could lead to a helpless reaction in circumstances when the individual feels overly challenged.

The above studies are quasi-experimental and use fabricated outcome measures, but there is also some evidence to suggest that such interventions can be effective at improving actual academic performance. Blackwell, Trzesniewski & Dweck (2007) included an intervention element in their study in which ninety-nine relatively low-achieving students were split into two groups, one receiving an intervention via an 'incremental training' course and the other acting as a control group. The intervention involved eight 25 minute workshops designed to foster incremental thinking and was shown to be a success, with participants more strongly endorsing an incremental theory after attendance. This incremental shift had a significant effect on their comparative academic achievement. The grade point average of the control group decreased across the duration of the study but this decline in academic performance did not occur for those who had received the incremental training. This effect was most apparent for those participants who had held an entity theory prior to the intervention as their change in grades was the most positive.

In addition Da Fonseca et al. (2008) found that incremental training improved the IQ test performance of students with generalized anxiety disorder, while studies by Aronson, Fried & Good (2002) and Good, Aronson & Inzlicht (2003) have demonstrated the effectiveness of incremental coaching on narrowing the achievement gap for ethnic minority college students in America. In both of the latter studies interventions that were designed to train students to view intelligence as malleable and dependent on effort resulted in those students showing increased grade point averages in comparison to their peers in the control groups. The students involved in the intervention also reported greater enjoyment

of and engagement with their academic subject. Good, Aronson & Inzlicht (2003) suggest that incremental coaching is more effective than additional skills training or extra revision classes. They suggest it is the shift in student's attitudes that helped them deal with their anxieties and improve their performance.

The two intervention studies discussed above are not devoid of limitations. Both focus on groups that are underachieving or have been shown to have a vulnerability to underachievement and for this reason it may not be possible to generalize the findings to the student population as a whole. Good, Aronson & Inzlicht (2003) allude to the complexity of the African American population that they sampled, with issues of ethnic stereotypes, gender and social economic status all playing a role. These studies do not explicitly compare the theories of intelligence or achievement goals of their samples to the wider population so it is not possible to ascertain whether underachieving individuals are more likely to hold entity theories than their peers or are simply more open to the positive effects of the interventions. Despite these limitations there is good evidence from both experimental studies and studies of real world intervention that theory of intelligence can be manipulated and that this can have a positive impact on academic performance and achievement. As said by Blackwell, Trzesniewski & Dweck (2007): "...even a brief targeted intervention, focussing on a key belief, can have a significant effect on motivation and achievement" (p.258).

Demographic variables and the gifted and talented population

Differences in Gender, Age, and Ethnicity

There have been relatively few studies that have directly identified age differences in theory of intelligence and there are some ambiguities in the results that have emerged. Studies by Ablard & Mills (1996) and Leondari & Gialamas (2002) have found that pre-adolescent children are more likely than teenagers to hold incremental intelligence beliefs. Dweck (2000) suggests that this is because society endorses the view that intelligence is fixed and stable and that as an individual grows up they become more aware of these social beliefs and adapt their own behaviour and 'theory' accordingly. However, evidence from Ahmavaara & Houston (2007) contradicts this. Their study finds a relationship between age and theory of intelligence such that the older members of the sample (14-15 years old) were more likely than the younger students (11-12 year olds) to have a more incremental theory of intelligence. In addition, Kinlaw & Kurtz-Costes (2007) found no difference between the kindergartners (4-6 years-old), 7-8 and 9-10 year-olds that they tested. Notably the age groups tested by the different studies above vary considerably, making comparisons difficult.

There have been studies of helplessness with younger children (Kamins & Dweck, 1999) and theory of intelligence with college students (Hong et al., 1998), though these studies do not attempt to compare one age group with another. In all age ranges there appears to be variability – both incremental and entity theorists clearly emerge in all age groups (Dweck, 2000). A longitudinal study that follows the development of theory of intelligence through the school career (and perhaps beyond) would perhaps provide a more comprehensive understanding of how it is

related to age, but it would also be necessary to ascertain the developmental variables that are responsible for any shifts.

Blackwell, Trzesniewski & Dweck (2007) used a longitudinal approach but they assumed that theory of intelligence remained stable, effectively using it as their independent variable (categorizing participants as 'incremental' or 'entity' and comparing these groups on longitudinal changes in other variables). Comparisons are further complicated by researchers using slightly different types of sample. For example, Ablard & Mills (1996) use an 'academically talented' sample while Ahmavaara & Houston (2007) compare students from selective and non-selective schools. This issue pervades the field and differences in sampling by age, gender and other variables makes cross-literature comparisons very problematic.

A few studies have shown gender differences in theory of intelligence. According to Dweck (2000), girls are more likely than boys to hold an entity theory and therefore fall foul of the 'helpless' response (Licht & Dweck, 1984; Licht et al., 1984). However, evidence from Ahmavaara & Houston (2007) contradicts this, demonstrating no significant relationship between gender and theory of intelligence and casting doubt over whether such a relationship exists. One variable that may explain the differences between the findings of Ahmavaara & Houston (2007) and those of Dweck's studies is that the former uses a British sample and the latter an American sample. Ahmavaara & Houston (2007) suggest that, although there has been plenty of work done in the USA, very little research on self-theories has been carried out in the UK. Their research aims to help plug this particular gap in the literature but this also raises questions regarding cultural

comparison. It is difficult to identify which culturally influenced variables are causing the differences that are observed to emerge.

The relationship between gender, age and theory of intelligence is further elucidated by findings from research that focuses on achievement goals. Though these studies do not explicitly measure theories of intelligence, based on the model it could be argued that goals are a by product of these beliefs such that those endorsing a learning goal are likely to be incremental theorists while those endorsing performance goals are likely to be entity theorists. Research into achievement goals has identified gender related patterns such that females are more likely to endorse mastery goals than males (Ablard & Lipschultz, 1998; Kenney-Benson et al., 2006; Shim, Ryan & Anderson, 2008).

Achievement goals have also been shown to vary as a function of age in several longitudinal studies (Fryer & Elliot, 2007; Chouinard & Roy, 2008; Shim, Ryan & Anderson 2008) but the findings are somewhat unclear and varied. For example Fryer & Elliot's (2007) study explores achievement goals at both the individual level and at the level of the sample as a whole and they suggest that their results "...provide clear and consistent evidence for the presence of both stability and change" (p.711) at these different levels. Chouinard & Roy (2008) found decreases in all achievement goals as part of a general decline of motivation in Mathematics over time.

Shim, Ryan & Anderson's (2008) longitudinal study of American adolescents found that females were more likely to endorse a mastery goal than males and that

mastery goals decline steadily for all participants between the ages of 11 and 13. Males were more likely than females to endorse both performance-approach and performance-avoidance goals. There were no interaction effects between gender and age – the two variables appeared to exert independent influences on goal choice. Though the age range covered by the study was rather narrow there is evidence here for achievement goals changing over time. It is unclear what drives these changes – they may be developmental or a result of changes in social interactions or school curriculum.

There have been few studies of the relationship between ethnicity and the model. Shim, Ryan & Anderson's (2008) study found an interaction between ethnicity and gender such that African American girls were the most likely to endorse a mastery goal, followed by European American girls, then African American boys and finally European American boys. Performance-approach (but not performance-avoidance) goals were also shown to be related to ethnicity, with African American boys endorsing them the most, followed by European American boys and finally girls from both ethnic groups. Witkow & Fuligni's (2007) study of over 700 American 10th graders (average age 15.8 years) found that Asian students reported higher levels of performance-approach goals than either Latino or American European students. Good, Aronson & Inzlicht's (2003) intervention study was aimed at improving the academic achievement of the traditionally underperforming African American student population, suggesting that they were generally more vulnerable to the helpless response than other ethnic groups given a prevalent entity type view that intelligence is not malleable.

Along with gender, age and ethnicity, there is scope to explore the relationship between the model and other demographic variables. For example, socioeconomic status (SES) has not been directly examined in the literature. It may be that SES does have an impact on either theories of intelligence or achievement goals and further research is necessary to ascertain this. These demographic variables clearly play a role in influencing the model but there are also other attitudinal variables that are of importance. These are discussed in the next section but it is first important to examine the literature on gifted and talented students and motivation.

Gifted and talented students

Given that this thesis will be focussing on the gifted and talented as a distinct population it is important to discuss some of the relevant literature about them. This will be performed in two parts, the first briefly examining the general motivational tendencies of gifted and talented students and the second exploring the relationship between the gifted and talented and Dweck's model.

There have been a number of studies that explore motivation in gifted and talented students. Phillips & Lindsay (2006) qualitatively explored elements of motivation in gifted and talented individuals (aged 14-15 years) through extensive interviews with students, their parents and their teachers. Results suggested that the gifted and talented were often very competitive (suggesting a prevalence of performance goals) but also not averse to taking 'intellectual' risks. The important role of support structures were also emphasised which suggests a substantial role for extrinsic forms of motivation. These results may not be generalizable to the entire

gifted and talented population given the limited sample but they do serve to identify some of the processes underlying motivation that may be of importance.

Gottfried & Gottfried (1996) used data from a longitudinal study of 9-13 year old students to examine the intrinsic motivation of the gifted and talented in relation to a comparison group. Their analysis revealed that the gifted students demonstrated significantly more intrinsic motivation across a variety of subjects when compared to their non-gifted peers. They also suggest that gifted students enjoy and engage with education to a greater extent than their peers and therefore that motivation is an integral part of giftedness. Vallerand et al. (1994) reported similar findings with a Canadian sample (average age of 10.1 years). Taken together the literature seems to suggest that gifted and talented students are generally more enthusiastic and motivated than their peers.

The above findings lead to Gottfried & Gottfried (2004) developing the concept of 'gifted motivation'. Gifted motivation is particularly high intrinsic motivation that drives those who benefit from it towards higher levels of achievement. Gottfried et al. (2005) provide some supporting evidence for the concept. They used a longitudinal design, monitoring the motivation and achievement of their participants at three time points: aged 6-12, 13-17 and at a subsequent time point such that a period of 24 years was covered. Their findings suggested that gifted motivation was distinct from gifted intelligence (high intellectual ability) and positively related to achievement, self-concept and post-compulsory educational progress. Motivation is considered to be central to giftedness across many

cultures. For example, Piirto (2002) describes how motivation is considered a key element of ability in an Indian school for the gifted and talented.

Gottfried et al.'s (2005) study is somewhat limited by sampling issues, with the use of a national database meaning that participants had to be followed at rather erratic intervals. Although their study has not brought mainstream acceptance of the concept of 'gifted motivation' (arguably it is better described in terms of high levels of intrinsic motivation), it serves to demonstrate how giftedness does not necessarily equate to high motivation. High ability is nothing more than wasted potential if the individual is not motivated to expend the necessary effort to capitalize on it and it appears important to explore how motivation can be fostered through models such as Dweck's.

Motivational processes certainly seem to be distinct from giftedness. Dweck & Leggett (1988) ascertained that the maladaptive 'helpless' pattern can occur regardless of the child's initial level of ability: "Indeed some of the brightest, most skilled individuals exhibit the maladaptive pattern" (p. 256). Dweck (2000) even suggests that gifted students may be more likely to hold an entity theory because they are usually at the top of their class (particularly in standard comprehensive schools) and are able to complete tasks aimed at their age group with relative ease. This inexperience of having to overcome challenging work through increased effort may lead them towards a belief that they are naturally more intelligent than their peers and could therefore foster an entity theory. In addition their high levels of achievement may mean that they receive substantial praise for their intelligence

from well meaning teachers and family members, a process which could inadvertently validate their entity belief system even further.

This makes gifted and talented students potentially vulnerable to the negative consequences of failure because when they eventually encounter a more challenging level of work (perhaps at university) they may respond negatively, believing that the set-backs they face indicate a lack of intelligence. A chain of failures could then lead to a helpless response and a decline in effort which could in turn lead to the student dropping out or underachieving. In this regard, through the inadvertent fostering of entity beliefs, giftedness could be viewed as having a de-motivating effect in the context of a classroom environment that does not provide substantial challenge.

Dweck (2000) identifies bright girls as a group that is particularly vulnerable to the helpless response. A study by Licht et al. (1984) found that high-achieving girls demonstrated a dramatic reduction in performance following failure at a task in which they had previously been successful. This was by far the most powerful helpless reaction compared to both less able girls and to boys of a variety of abilities. High achieving boys showed the most improvement. This finding demonstrates that gifted and talented students are vulnerable to the helpless response but also raises a question over whether there are further subsets of the gifted and talented population that are more vulnerable to failure than others because it demonstrates a possible interaction between high ability and gender.

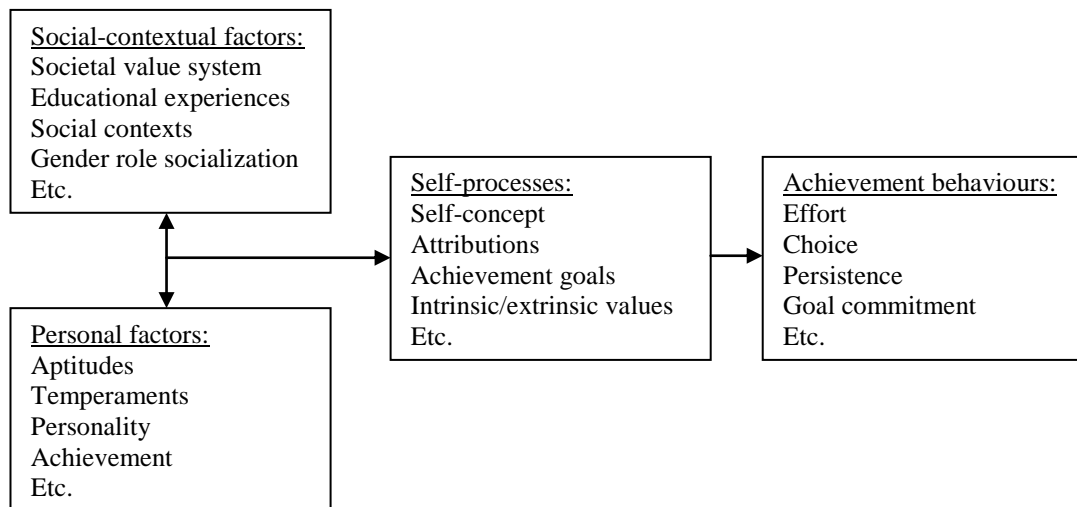
In contrast to the suggestions of Licht et al. (1984) & Dweck (2000), the literature regarding the model and gifted and talented students is somewhat inconclusive. Ziegler, Heller & Stachl (1998) examined Dweck's framework in the context of German Gymnasium - grammar schools which have entry examinations and aim to admit only the academic top third of students. They sampled 1187 fourteen year old students and divided them into average, gifted and highly gifted groups based on cognitive ability test scores. Participants then completed a battery of measures including those for implicit theories of intelligence and achievement orientation (measuring learning and performance goals). They found no support for Dweck's model. Most students maintained an incremental theory of intelligence while also endorsing performance goals. In addition they found no significant differences in goal orientation or theory of intelligence between the different ability groups.

Ziegler, Heller & Stachl (1998) acknowledge a limitation to their study. Their achievement goal measure was substantially different to the ones used in the majority of the literature and was adapted from a measure of achievement orientation that was originally designed to measure a slightly different concept. However they suggest that their alterations to the items validate the measure. They suggest that Dweck's model may lack domain specificity: "School-related statements are perhaps interpreted in a completely different manner by a mathematically interested student or by a student whose interests focus more on artistic subjects" (p.62). Their findings are supported by Ziegler & Stoeger's (2004) study which also suggests that commonly used achievement goal structures do not apply to the gifted and talented.

Though collating the findings of these different studies reveals ambiguities that make drawing strong conclusions about the applicability of Dweck's model to the gifted and talented difficult, the process does not contradict the importance of studying motivational variables. Dai, Moon & Feldhusen (1998) review the literature on achievement motivation and conclude that social cognitive approaches such as that taken by Dweck's model provide a useful theoretical framework for exploring motivation in gifted and talented students. **Figure 3** shows the broad social cognitive framework that they suggest.

Figure 3 expresses the complexity of achievement related behaviour but also provides a framework from which Dweck's model can be understood and related to the gifted and talented. The basic structure of the model in which a personal factor (a belief about intelligence) leads to a self-process (achievement goal) which leads to a behaviour (effort), functions within this broader framework but all of the variables within can still influence the model. Although research with Dweck's model can only practically use a limited number of variables, it is important that these variables are not viewed in isolation. The next section of this review explores some of the other key variables that may be important mediators of the model.

Figure 3 Dai, Moon & Feldhusen's (1998) Social cognitive model (p.47)



Mediating and related variables

Theories of intelligence and achievement goals have been researched in relation to other motivational and personality based variables and also incorporated into studies in which they are not the main focus. This next section briefly examines the studies that have explored the relationship between theories of intelligence, achievement goals, confidence, self-concept and attribution, paying particular attention to those variables most relevant to the model and the gifted and talented.

Attribution

In this context attribution is referring to the reasons an individual perceives for their achievement related behaviour. The attributions an individual makes when they succeed or fail on an academic task are dependent on their theory of intelligence because it dictates how they interpret information. The entity theorist is likely to reflect on their own ‘fixed’ abilities while the incremental theorist is likely to think about malleable internal factors (effort, strategy) or external factors. Good, Aronson & Inzlicht’s (2003) suggest that: “Dweck’s work on implicit theories of intelligence reveals a clear kinship to attribution theory” (p.658). Their study (see p.65) implemented both an attribution and incremental intervention but they suggest that the two are in fact very similar and entwined. The earlier studies on the helpless response viewed attributions for failure as a core part of maladaptive behaviours (Diener & Dweck, 1978, 1980). Building on this, Hong et al. (1998) examined theories of intelligence in college students and found that those with entity beliefs were significantly more likely to blame academic failure on their own ability than students who held an incremental belief. Those with an incremental theory tended to blame failure on poor strategy or lack of effort.

As part of their study, Kennett & Keefer (2006) performed a regression analysis on data from Canadian undergraduate students and found that theories of intelligence did not have a direct relationship with academic self-control (consisting of positive behaviours related to performance such as problem solving and delay of gratification), though it did have an indirect one which was mediated through ability attributions. Attributions about ability and task difficulty explained a significant proportion of the variance in theory of intelligence scores, with incremental theorists less likely to blame a poor grade on their lack of ability than entity theorists. Their study does have some limitations. Their sample was 87% female and thus they were unable to adequately analyse gender differences. Also they did not directly incorporate achievement goals beyond basic performance and learning types, failing to account for the role of approach and avoidance performance goal types. However, their study does demonstrate that the relationship between theories of intelligence and attributions is a close one, suggesting that the two reinforce each other.

As part of their longitudinal study, Blackwell, Trzesniewski & Dweck (2007) tested 'helpless attributions' and effort beliefs following failure on a task. Their measure for attributions required participants to respond with their level of agreement on a Likert scale to items such as 'I wasn't smart enough', while effort was measured using items such as 'If you're not good at a subject, working hard won't make you good at it' (p.250). They found that holding an incremental theory of intelligence was linked with positive effort beliefs (that ability can improve with effort) while effort beliefs were negatively correlated with helpless

attributions. Their different measures are rather definitional in some ways (intelligence beliefs were originally defined in terms of beliefs about effort and helpless attributions), but the isolation and then reunion of these concepts serves to provide a broader picture about how attitudes, beliefs and attributions are linked at different levels.

Confidence and Self-concept

Before beginning this section it is worth briefly defining and disentangling the terms confidence, competence, self-esteem and self-concept. Self-esteem is widely used to refer to an individual's general sense of self-worth and contentment with themselves and is part of the wider field of self-concept (e.g. Marsh, 1986). Self-concept breaks feelings of self-worth into domain specific elements, such that an individual may be positive about one aspect of themselves but negative about another (Shavelson, Hubner & Stanton, 1976; Byrne, 1984; Marsh, 1986). To illustrate, *academic self-concept* refers to a person's feeling of self-worth with specific regard to performance in school or other academic settings while *peer self-concept* refers to feelings of self-worth with regard to friendships and other relationships with peers. Confidence and competence are also commonly used phrases. In the context of this thesis these are related to academic self-concepts but tend to be focussed on specific tasks or objectives, referring to an individual's beliefs about whether they can achieve success. The terms are not interchangeable but their conceptual similarity is such that it is reasonable to examine them together in this literature review.

Various types of self-concept have been shown to be related to academic achievement. A good overview of the relationship is provided by Marsh et al. (2006) who performed a study based on data from a large research project in Germany. They examined measures for multiple forms of self-concept along with various measures of personality and nine outcome measures of academic performance. They found that the academic types of self-concept had differentiated patterns of correlations with their outcome measures, though general self-esteem did not correlate. They suggest that it is important to take a multi-dimensional view of self-concept when exploring its relationship with achievement and to realise the relationship is reciprocal – academic self-concept effects achievement and achievement effects academic self-concept. The relationship between academic self-concept and academic achievement is supported by a number of studies (e.g. Shaalvik & Hagvert, 1990; Muijs, 1997a; Guay, Marsh & Boivin, 2003).

There is some evidence to suggest that self-concepts and confidence can mediate elements of Dweck's model. Elliot & Church (1997) provide empirical support for the notion that beliefs about competence (confidence) in part dictate whether an individual adopts a performance-approach or a performance-avoidance goal, with those with high confidence adopting performance-approach goals and those with low confidence adopting performance-avoidance goals. Leondari & Gialamas (2002) also found that perceived competence was positively related to performance-approach goals but held a negative relationship with performance-avoidance goals. However, this study somewhat undermines Dweck's model by

suggesting that theories of intelligence do not influence academic achievement (see above, p.56).

Similarly, Gonida, Kiosseoglou & Leonardi (2006) examined prior academic performance in relation to implicit theories of intelligence as part of their study and found that feelings of competence mediated the relationship between the two. Though they do view perceived competence as an important variable, they suggest that this demonstrates that the causal assumptions of Dweck's model are incorrect. Senko & Harackiewicz (2005) also provide evidence that supports the bi-directional relationships between confidence, achievement and achievement goals. Their study found that negative performance feedback following a test lead to a decrease in both learning and performance-approach goal pursuit and an increase in performance-avoidance endorsement. However, performance-approach goals also predicted success in exams suggesting that the relationship between the two is symbiotic and mediated by confidence (itself strongly influenced by performance related feedback). The relationships between the variables are clearly rather complex.

Ahmavaara & Houston (2007) carried out one of the few studies to explore theories of intelligence in a British sample. Their model postulated that school type (selective or non-selective), gender, age and theory of intelligence predicted students' aspirations, and that this effect was mediated by self-esteem (general self-concept) and confidence in intelligence. Their results were based on regression and mediation analysis and were largely supportive of Dweck's framework, suggesting that theory of intelligence can predict aspiration (with an

incremental belief leading to more positive aspirations) and that this effect is mediated through both self-esteem and confidence in intelligence. However, notably, the effects of holding an incremental theory were only significant for students at selective schools.

The use of aspirations as an outcome measure rather than a measure of academic or cognitive performance provides a different perspective on Dweck's model. Aspirations were measured using three items: Likert-scale responses to 'I will go to university' and 'I will leave school when I am 16' and the coding of the open question 'What job would you like to do when you have finished your education?', with these items being combined and coded such that the jobs were classified as either professional, skilled, semi-skilled or unskilled. It would be interesting to have also known the relationship between the motivation variables and actual performance. Also useful would have been to measure multiple types of self-concept rather than just self-esteem, though the measure of confidence in intelligence could be described as a measure of a type of academic self-concept.

Not all studies emphasise the role of self-concepts and confidence. Dweck, Chiu & Hong (1995) play down the role of confidence, suggesting that any educational interventions designed to improve academic achievement would be more successful if they targeted maladaptive intelligence beliefs rather than trying to raise confidence. Hong et al. (1998) offer some support for this, finding that theory of intelligence was a more significant predictor of success than confidence for students faced with failure or uncertainty. Dweck (2000) suggests that raising confidence through praise can foster an entity theory and therefore theory of

intelligence is more significant than confidence itself. Henderson & Dweck (1990) support this notion, finding that entity theorists who were high in confidence demonstrated a significant decline in performance as they made the transition from grade school to junior high school. They suggested that confidence could not immunise an individual with entity beliefs from the negative connotations of failure. Ziegler, Heller & Stachl (1998) found that confidence was linked with ability but failed to support Dweck's model overall (see p.75).

It is possible that drawing the literature together does not produce clear findings because the concepts of theory of intelligence and self-concept actually overlap. When the theoretical model was first being derived Dweck & Leggett (1988) suggested that entity and incremental theories of intelligence actually represent two different forms of self-concept. For an entity theorist, the self is a collection of fixed traits or attributes that do not vary throughout life and can therefore be measured. For the incremental theorist the self is much more fluid – constantly evolving as a result of the individual's behaviour and environment. They suggested that these differing self-concepts may have an impact on general self-esteem because they imply that the level to which an individual is 'satisfied' with their personal attributes will vary.

For the incremental theorist, self-concept can be raised through improving skills and attributes. The pursuit of skills that the individual values (learning goals) along with the successful negotiation of challenge results in the individual feeling that they are improving and this has a positive impact on their self-esteem. Those with an entity theory on the other hand seek to gain boosts in self-concept through

the positive evaluation of their existing attributes. Their belief that performance is based on a stable and unchanging attribute leads to a desire to demonstrate that they are skilled at a task or superior to their peers (performance goals). If the performance goals are successfully achieved self-esteem is raised but this belief structure carries risk – failure can damage self-esteem as it implies that the individual is not capable (and never will be). Although the terminology is being used slightly differently in this relatively old study, this early theoretical reasoning serves to illustrate how closely related these social cognitive variables are perceived to be in the literature. Though the exact nature of the relationship between self-concept, confidence/competence beliefs, achievement goals and theories of intelligence is not clear it is apparent that the concepts are inter-related.

The overall picture

Bringing the strands together

This literature review has covered a diverse range of material in an effort to integrate multiple strands of research. The overall picture that emerges is that Dweck's model is largely coherent, but under-researched in some key areas and somewhat clouded by ambiguous findings in others. Variables such as gender, age and self-concept have all been found to be relevant to the model though the findings have been somewhat inconsistent. This is not necessarily problematic as the theoretical model is broad in scale and aims to provide a generalizable structure rather than a comprehensive predictive tool for all contexts. However, it does mean that the model does not always capture nuance and detail, particularly with regard to sub-populations such as the gifted and talented.

There have been some studies that explore the model with regard to gifted and talented students but given the high academic potential of this group it seems important to build on this research. This thesis focuses on the gifted and talented within the framework of the model in an attempt to ascertain which components work and which do not with this specific population while also seeking to understand the motivation and attitudes of the gifted and talented more generally. Exploring the intelligence beliefs and achievement goals of the gifted and talented could provide a valuable insight in to how this group differs from the rest of the population and if they have differing needs that must to be met. Intervention programs based on the model have been shown to benefit the performance of various groups and it may be that such interventions could benefit the gifted and talented if the model is shown to apply to them. Further research will also help in

the exploration of gifted and talented students as a heterogeneous group, identifying any subgroups that differ with regards to their intelligence beliefs and achievement goals and therefore may benefit from a more differentiated approach regarding policy and provision.

Perhaps most challenging is integrating all of the research on the myriad of different motivational variables. For example, self-concept emerges as an important variable, with some evidence suggesting that it mediates the relationship between theory of intelligence and achievement goals. It seems important to integrate some of these variables but all of the studies capture different elements of the wider picture and it would be a task beyond the scope of this thesis to synthesize all of these variables into a comprehensive study and to analyse the thousands of ways in which these variables could be interacting. For this reason the main focus of the quantitative element of this thesis are the main components of the model itself, theory of intelligence, achievement goals and academic achievement, with the variables of gender, age, ethnicity, socio-economic status and self-concept analysed peripherally.

Rather than trying to prescribe too many variables using quantitative measures from the literature it is perhaps a more viable approach to allow the participants to explicitly state what they believe is relevant and important. Identifying other variables that may be of relevance and exploring how they may mediate the formation or consolidation of intelligence beliefs and achievement goals is potentially very useful as it may help researchers to gain a richer understanding of the components and processes that constitute the model. Dai, Moon & Feldhusen

(1998) state that: “More research is needed to untangle the intricate relations of giftedness, achievement motivation, and talent development” (p.60). An open search for other important factors constitutes part of this thesis.

As discussed in **chapter I**, this thesis uses mixed methods that include inductive qualitative approaches along with the quantitative study of the model. As such, this literature review represents only the tip of the iceberg. There are many approaches to motivation and, although this thesis is based predominantly on the implicit theories of intelligence and achievement goal literature, the open approach of the qualitative study may require other elements to be discussed. The literature points to the complexity of motivation and the belief structures underlying it and for this reason it is important to avoid a narrow focus that isolates variables from each other and from the context in which they are measured. A flexible approach to understanding theory of intelligence, goals and what this means to gifted and talented students is necessary if a greater understanding is to be gained.

Overall this thesis aims to explore a specific part of the literature on motivation from the perspective of a specific population. While the framework of the model provides a useful macro explanation about how attitudes can lead to positive or negative behaviours, exploring the specific population of the gifted and talented with a mixed method approach will provide an essential micro view that may be able to extrapolate finer details about the complexity of human behaviour. It is hoped that this sharper insight could be used to aid in the development of targeted

educational provision for the gifted and talented that maximizes their potential and increases their well being.

Research Aims

While it is important to recognize the complexity of the research reviewed in this chapter it is necessary to narrow the focus onto a specific set of variables and identify some key questions in order to add useful evidence to the field. Six key research aims are outlined in this section and specific details regarding how they have been formulated and how they are approached are discussed.

1. Test Dweck & Leggett's (1988) model with regards to gifted and talented students, using academic performance in national assessments as an outcome variable.

Based on this literature review it is arguable that this question is the most fundamental. Support for the model is not unanimous and this is because it is likely to be influenced by a number of factors, many of which result from the characteristics of the population it is applied to. Theory of intelligence, achievement goals and academic achievement will be examined using measures from the literature and the data from a substantial sample of gifted and talented students will be analysed. The relationships between these three core variables will be explored statistically to ascertain whether the model applies to gifted and talented adolescents in England.

2. Explore differences within the sample with regard to gender, age, socio-economic status and ethnicity.

Some differences in the above variables have emerged throughout the literature (with the exception of socio-economic status, which appears under-researched) and for this reason it is important to integrate them into the research design. Gifted and talented students are not a homogenous group and there may be important demographic differences and interactions within the key variables.

3. Ascertain how, if at all, self-concepts are related to theory of intelligence and achievement goals.

Self-concept and task-specific confidence have emerged as important in the literature and the former can be integrated into the quantitative element of the research design. Different domains of self-concept might have relationships with the key model variables and these relationships may be unique to the gifted and talented population.

4. Qualitatively explore the theories of intelligence of gifted and talented students and ascertain how, if at all, they differ from the theoretical framework of the model.

Kennett & Keefer (2006) suggest that:

Perhaps it is time to investigate the nature of goals in a qualitative design rather than trying to validate various a priori suppositions, and to explore

the differences in meaning and interpretation that high and low resourceful students assign to ability, challenge, achievement and high grades. (p.455)

This idea permeates the qualitative elements of the research discussed in this thesis. A sample of gifted and talented students was explicitly asked to openly discuss their theories of intelligence and whether these beliefs influence their goals and behaviour. These responses can be compared to the body of literature discussed in this chapter.

5. Explore how theories of intelligence may or may not be important to gifted and talented students in the school context through use of qualitative research methods.

This aim is also part of the wider remit to understand the nuances of the model. Much of the previous research has used context neutral psychometric instruments but the qualitative element of this thesis will allow participants to reflect on grounded real world incidents or contexts where they believe intelligence beliefs or achievement goals may play a role. Important contextual or domain specific factors may emerge from open questioning and such insights may be important for designing future research.

6. Draw out possible differences between gifted and talented students and the rest of the student population by using the existing literature.

This final question is about integrating the findings of the thesis as a whole and viewing it in the context of the existing literature. Key variables that distinguish

the gifted and talented from their peers may or may not emerge from the data but it is important to look for them as they may provide an insight into how to improve targeted provision.

Summary

This chapter has covered research from a variety of fields, synthesizing it as far as possible and funnelling the concepts, theories and findings into a research rationale and set of research questions. Combined with **chapter I** the overall context in which this thesis exists has been established. Care has been taken to identify the key theoretical framework that will underpin the research while the evidence that supports and undermines that framework has been dissected so that limitations, ambiguities and potential pit falls may be recognized.

The research questions that guide this research have been stated and clarified and the next stage is to describe and analyse the research that was carried out. The next five chapters each pertain to a different part of that research, with the first of these dealing most directly with one of the key issues discussed in this review: to what extent does Dweck's model apply to gifted and talented adolescents?

Chapter III: Implicit theories of intelligence questionnaire

This chapter discusses the development and implementation of the survey which provides a primary source of data for this thesis and also provides key information about the participants. This is achieved over three stages. First, the initial pilot study is discussed in some depth to explain the development of the questionnaire and certain important design decisions. In the second stage, the final version of the questionnaire is described in detail, and the reasons for choosing each instrument as a measure for each concept are discussed. The third stage explores the demographic data of the respondents, providing background information that is important for interpreting the findings. This chapter serves to frame the analysis in the following chapters and fulfils the need to make the research replicable.

The pilot

A survey of NAGTY members that contains multiple measures and gathers relevant demographic information provides the foundation for this thesis. Given the fundamental importance of this survey it was considered imperative that the questionnaire gathered all of the necessary data for the research design and was made coherent and attractive to respondents. An effective pilot was deemed vital for achieving this objective. The first design of the questionnaire was piloted with a small group of NAGTY students in order to identify any weaknesses or areas for expansion. This section discusses the pilot stage; describing the survey design, how it was perceived by respondents and what changes were implemented. In general, the measures will only be briefly discussed here – they will be handled in greater detail later in the chapter when the main survey is discussed.

Participants

The pilot was sent out by email to 102 NAGTY members, all of whom were part of the student council (a group of members elected by their peers to represent the students and liaise with NAGTY). Participants were asked to complete the survey in their own time and, if appropriate, add comments regarding how easy the questionnaire was to complete, whether it made sense, whether it was interesting and how long it took to complete. They were also asked to make specific suggestions about how the questionnaire could be improved. Twenty-five students responded to the pilot (24.5% response rate), with 22 also making evaluative comments. Two students commented but did not attach a completed survey. Precise demographic details of the sample are unknown.

The survey:

Academic Achievement

In order to capture data about how theories of intelligence and academic goals interact with academic performance it is necessary to gain as much data about student performance as possible. Three separate tables were included in the pilot questionnaire to collect *Key stage levels* and exam results at three important stages of compulsory education. For Key stage 2 (10-11 year olds) and Key stage 3 (13-14 year olds), participants were asked to write the level they had attained in mathematics, science and English (if they had taken those exams). These levels are expressed as a number and represent the progress of the student through the national curriculum (for more on the national curriculum, see Qualifications and Curriculum Authority, 2009).

For Key stage 4 (GCSE exams, usually taken by 15-16 year olds) participants were asked to indicate their grade (if indeed they had one) for sixteen subjects: English language, English literature, mathematics, chemistry, physics, biology, geography, performing arts, history, religious education, modern foreign languages, music, physical education, design & technology, art & design and information & communications technology. A tariff score for the best nine results was calculated for each student that had taken at least nine GCSEs. These measures are designed to cover the variety of educational stages that participants in the study will have reached.

Theory of intelligence

This measure is taken from Dweck (2000) and is discussed thoroughly in the next section and in **chapter II, p.41**. Respondents used a six point scale to indicate their level of agreement with each of six statements about the nature of intelligence. Participants were ‘scored’ on a continuum from an ‘incremental’ theory, through to an ‘entity’ theory. It was also possible to divide participants into three groups based on this score (‘Entity’, ‘Incremental’ and ‘Neither’); a process usually performed in the work of Dweck (2000). Differences in intelligence beliefs were compared statistically regarding academic achievement, achievement goals and self-concept.

Achievement goals

This measure is taken Grant & Dweck (2003) and is discussed in greater depth in the next section and in **chapter II, p.47**. Respondents used a four point scale to indicate their level of agreement with each of 18 achievement goal related statements. Participants were ‘scored’ on each of six types of achievement goal (outcome, ability, normative outcome, normative ability, challenge-mastery & learning) and then relationships with academic achievement, intelligence beliefs and self-concept were explored statistically.

Self-concept

This measure is taken from Muijs (1997b) and is discussed thoroughly in the next section. Respondents used a four point scale to indicate their level of agreement with each of 32 statements pertaining to self-esteem and seven different types of self-concept. A self-concept score was generated by adding numeric values (1-4)

for the relevant set of items. Differences in self-esteem/self-concept between groups with different intelligence beliefs/achievement goals were explored to try to ascertain if certain beliefs are related to differing levels of self-concept. The data was also explored with regard to academic achievement.

Motivation

Participants were given space to answer the following three open questions:

1. *Please write a few sentences about the type of things that motivate you to work hard at school.*
2. *Please write a few sentences about the type of things that put you off working hard at school.*
3. *Please write a few sentences about what you understand by the term 'intelligence' and where you think intelligence comes from.*

These questions are also discussed in greater depth in the next section.

Pilot Comments

Generally the participants felt that the pilot was simple to understand and not too long, with most students stating that it took them between 5 and 20 minutes to complete. Most of the participants stated that they found the questionnaire interesting and the majority also provided their email address to state that they would be willing to take part in a follow up study. One student said that:

It does interest me as the questions are relevant to me and all apply to me.

Also the questions make you think.

Another participant said that:

...it is also quite interesting, especially the last question when it asks 'what do you understand by the term intelligence' as it is not something I have thought about a lot

Not all participants shared this rather self-reflective interest:

To be frank, it didn't particularly interest me, but if it helped as the basis for formulating future learning programmes, then I consider it a worthwhile exercise.

This participant seemed to take part because they wanted to help the research programme rather than out of personal interest. It is unlikely that those students that found it neither interesting nor believed it to have practical merit took the time to complete it.

The issue that participants mentioned most frequently was the repetition of questions. With reference to the self-concept and achievement goal measures participants often mentioned the laborious task of repeatedly answering questions they perceived to be essentially the same but phrased slightly differently:

...some of the questions that were repeated with virtually the same wording several times did make me start to lose interest.

This criticism was made by many of the participants and a few suggested that the study could be made shorter and more user-friendly by amalgamating some of these questions. A few participants also disliked the scale for answering these sets of questions, suggesting that is caused confusion when it was reversed for a few items. One participant also did not appreciate how the scales forced a choice:

I think there should be a middle column put in for students who neither agree nor disagree on certain questions.

One student said that some of the self-concept items were abrasively worded:

I did find it quite probing and some of the questions (e.g. I often think I'm worthless) are quite harsh and may need to be rephrased as they seem quite abrupt.

With regards to wording a few participants suggested that a number of the questions about the nature of intelligence were confusingly phrased and required some clarification.

The relevance of the maths and English self-concept items was questioned by one participant who suggested that for many students these items were not relevant post-GCSE as many had ceased to study these subjects. The element of subject choice was also raised elsewhere with regard to the fact that students are allowed to select courses for their GCSEs. It was suggested that the list of GCSEs offered in the first question were not comprehensive and lacked flexibility:

...the GCSEs chosen are unlikely to be the GCSEs people have done. I know it is trying to make it easier for people but I think it would be more convenient just to ask them to write in the subject names themselves (unless you are only interested in certain ones?).

A small number of participants seemed concerned about the tone of the questionnaire. One participant suggested that the prescribed nature of the possible

responses for questions 1-4 may stifle individuality and lead to inaccurate or ‘dishonest’ responses:

... I do not think that it (is a questionnaire) that is likely to be responded to with truthful answers in the main bulk of cases; as the questions seem intimidating and tend to imply that the large majority of people who are answering the survey are slightly arrogant. ... It could be improved if open-ended questions were used, because this would help members to express themselves fully without worrying about what type of person they come across as. As a NAGTY student, I would not want to fill in the survey in its current state.

In summary, participants had no major problems completing the questionnaire but they did raise a number of key issues that needed to be addressed for the final version. These issues, and others that arose from the process of analysing and interpreting the data, will now be explored in greater detail.

Pilot discussion

This discussion is split in to three sections. The first deals with issues concerning the analysis of the data, the second with the issues raised by participants regarding how easy to use the questionnaire was, and the third outlines the changes that were made as a result of the pilot process.

Analysing the data

Data was easily inputted in to SPSS and the analyses planned for this thesis performed without any problems. It is not the purpose of this pilot report to

analyse and interpret the data but some broad elements of the analytical process are worth discussing. It was hypothesised that there would be differences between entity and incremental theorists with regard to their goal preferences but there were few statistically significant differences between entity and incremental theorists within the pilot sample. However an examination of the differences between mean scores on the various measures suggests that this lack of significance was possibly the result of the small sample size rather than similarity of response between groups. Repetition with a larger sample was deemed the only way to truly explore the hypotheses.

Because the survey was only in pilot form, student ID numbers were not collected and so data regarding gender, age, ethnicity and socio-economic status (SES) was not available. It would have been useful to explore this data with regard to these variables in order to test run analyses and ensure such data was easily accessible. However, this omission was not too problematic for the pilot study for three reasons. Firstly, none of the omitted variables are of core importance to the theoretical model, secondly data for these variables were viewed as relatively simple to collect using NAGTY's databases for the final sample, and finally the data for the omitted variables is nominal with only a few levels and so is simple to input and analyse.

Another problem came from the fact that the measures were not coded intuitively. The lower the coded scores the more positive an attitude it corresponded to. Although this did not affect the validity of the data itself it did make interpretation confusing at times which could in turn lead to a less coherent interpretation. When

the data from the final version was being analysed care was taken to make sure data was coded in a way that made later analysis and interpretation as intuitive and accurate as possible.

More problematic was the academic achievement data. Ceiling effects meant that there was little variance between participants which made statistical analyses difficult to perform. Despite this problem it was necessary to keep this measure in the final survey. Even if participants who hold different intelligence beliefs cannot be compared with regard to academic achievement it is useful to have evidence of the sample's high ability. The measure that produced the best variance was the GCSE tariff score but only a small number of participants had taken their GCSEs. This problem was viewed as surmountable through the use of a stratified sampling approach that could target the student population that had already taken their GCSEs. It was considered likely that such a group would produce more varied achievement data.

The use of a stratified sample was given considerable thought as such an approach would need to be balanced by also sampling a group of younger students. It was decided that this would also have the added benefit of allowing an insight into developmental differences between these age groups. Eleven to thirteen year olds (who had completed Key Stage 2 exams in the last few years) were viewed as offering an interesting comparison group given the potentially large difference in experience and development. Though there was a concern that this may have removed the nuance of exploring a range of individual age differences it was

decided that, because the thesis does not specifically aim to explore a developmental perspective, this simpler, broader comparison may be more useful.

The final survey was paper based rather than electronic and sent out to a predefined but random stratified sample. It should be noted that for the pilot the sample was implemented electronically over email using a mailing list that constituted the student council; a group of peer-elected students that meet regularly, either face to face or online, to discuss Academy issues and provide feedback and advice for NAGTY's student academy. This group could therefore be described as invested in NAGTY and highly motivated. For this reason it is very possible that they were not entirely representative of all NAGTY members. This issue was not considered too important given that the primary purpose of the pilot was to gain feedback that would improve the survey rather than to generate research findings.

Finally, the responses to the open questions were generally very useful. They were more reflective and insightful than expected which is perhaps a product of the sample group's high ability. They reflected the complexity of student motivation and the multiple intrinsic and extrinsic factors that influence it. It was decided that by retaining them in the design the focus of the research would not become too narrow. Also useful was gaining an insight in to explicit student beliefs. Although the context of the data collection itself is not known (the situation that the participant was in when they completed the questionnaire), the participants seemed to offer an insight which was often contextually specific, something that is perhaps missing from the other more rigid instruments. This data demonstrated

potential for providing a platform for further qualitative exploration through the use of interviews.

Using the survey

The self-concept measures were criticized by participants for being too repetitive and featuring questions that were rather abrupt in their language. There was also some criticism from participants regarding the lack of a middle point or the lack of a ‘don’t know/ not sure’ option for the response scales on the self-concept, theory of intelligence and achievement goal instruments. This is an important issue as it raises questions regarding the validity of the measure. There are a multitude of reliable self-esteem measures available that have also been used in a variety of contexts (Blascovich & Tomaka, 1991), so an alternative instrument could be sought.

However it was thought unlikely that other measures would provide such a diverse conception of self-concept while also being ‘user-friendly’ for participants. In other words, for the purposes of this study, there is unlikely to be a measure that is better suited. The strengths and weaknesses of the measure are discussed in more depth in the next section (p.117). Flaws such as repetition are inherent in many psychological measures and so it was decided that there would be little benefit in changing to a different (unpiloted) instrument on this basis.

Participants suggested that the measure for recording GCSE achievement could be refined by providing ‘blank spaces’ rather than prescribed subjects. This would allow participants to list courses that were not on the pilot questionnaire. This

suggestion was simple to implement and would increase the validity of the measure by allowing participants to express themselves more accurately. A few participants that had taken their GCSEs suggested that the measures of English and maths self-concept were no longer relevant to them because they were no longer studying those subjects. This was an important point to consider because the proposed new sampling procedure meant that about 50% of those sampled had completed their GCSEs.

The value of the self-concept data for maths and English outweighed the possibility that participants no longer studying those courses would be able to respond to the questions in a valid manner. All participants will have studied the subjects within the last few years as part of the national curriculum, regardless of whether or not they chose to continue studying them, and so it seemed reasonable to assume they would be able to reflect on their past experiences to respond to the items. It was decided that in order to address this issue as far as possible without excluding the measures a short sentence would be included in the instructions that informed participants who no longer study maths or English that they should answer the relevant questions by reflecting back to a time when they did.

The changes

Overall the survey seemed to be effective. Participants did not encounter any difficulties completing it and aside from a few issues regarding repetitive instruments and unrefined measures of academic achievement, most participants were positive about it and many reported that they enjoyed completing it. The process of completing this pilot study was very useful as issues arising from

implementation and analysis, along with comments from the students informed the design process. A number of outcomes were decided upon following the pilot:

- The measures of self-concept were considered. Alternative standardized measures are available but the piloted instrument breaks down self-concept into eight factors that are relevant and intuitive and has been designed with this age range in mind. A change was deemed unnecessary.
- Despite some constructive criticism regarding the repetitive nature and confusing wording of some items in the three instruments, they were not edited. It was deemed necessary to keep the measures standardized and identical to the ones used in other studies for comparative purposes.
- The suggestion that a mid-point or a 'not sure' choice should be added to the scales was considered. However, this also remained unchanged for the purposes of standardization and also because it was necessary to make some participants think carefully about the item (rather than just select the non-committal option) and to force them 'off the fence'.
- The sample was changed for the final questionnaire and split between two age groups, one currently studying for A-levels (aged 16-18) and one in the early years of secondary education (aged 11-13). This decision was made to make statistical comparisons on the basis of age easier. It was also considered that a targeted approach to sampling may help to identify age-related trends with regard to intelligence beliefs and achievement goals.

- The instructions for the measure of self-concept were altered to include a brief sentence addressed to those participants that no longer studied maths and English asking them to answer the relevant questions by reflecting on their general ability in these subjects or by recalling their ability at the time when they were studying them for their GCSEs.
- The measure for GCSEs was changed to provide a blank grid. Predefined subjects were removed and blank spaces left so that participants had more flexibility to fill in their own subjects.
- The data for self-concept and achievement goals were coded in a way that was not intuitive for this pilot. This was changed for the final version in such a way that higher scores reflected a more positive response.

With the pilot discussed this chapter will now provide a detailed account of the final version of the survey along with more information about the measures.

The main survey

Sample

The survey was posted to 1224 members of NAGTY. The sample for this study was stratified by gender, age (11-12 years old or 16-17 years old) and geographic region (9 regions – **see table 1, p.121** for a breakdown) in order to gain an equal number of students from each group. There was no stratification by ethnicity or socio-economic status, as it was expected that the semi-random nature of the sampling would produce a relatively representative group of participants. It is important to discuss the indicator of socio-economic status that was used – A Classification of Residential Neighbourhoods (ACORN). The ACORN database designates a classification to each and every postcode in the United Kingdom based on economic and social indicators gathered by the national census and lifestyle databases.

There are 56 ACORN types and over 400 variables are gathered to ascertain the ‘type’ for each postcode (CACI Limited, 2002). For this study the five overarching ACORN categories of ‘wealthy achievers’, ‘urban prosperity’, ‘comfortably off’, ‘moderate means’ and ‘hard pressed’ will be used. Despite wide-spread use in a number of fields it is worth expressing the need for caution when interpreting ACORN data as a proxy for social class. Postcodes encompass multiple addresses and so a degree of generalizing occurs during classification. ACORN is a classification of residential area rather than individual households. While in most cases such generalisation may be rather minor and therefore not problematic it is entirely possible that in some cases participants may live at postcodes that do not reflect their individual characteristics (for example an

individual living in a postcode designated 'Crowded Asian terraces' might not be Asian). The issue of how accurate and detailed (and therefore internally valid) classification of social status can be is always existent in large scale social research and ACORN is as accurate and comprehensive a method for ascertaining this as any but the need for caution remains.

The stratification of the sample was a meticulous process. NAGTY's database was used to produce a full list of students who met the criteria of being both available for research contact and being aged either 11-12 or 16-17 years old. A total of 19,742 students were identified based on these criteria and their details were pooled into a numbered list. This list was inputted in to an Excel spreadsheet and was therefore easy to manipulate - the file was organized first by age, then gender, and finally region. There were 36 possible combinations of age, gender and geographical region (2 x 2 x 9) and a random number generator was used to select 34 students from each of these possible combinations. The range of the random numbers that were generated was manipulated so to choose only from the relevant students in the list for each combination. If a particular student was selected twice then an extra number was generated and a new student selected.

Procedure

Each individual in the sample was mailed a copy of the questionnaire along with a stamped addressed envelope with which to return it and a covering letter. Each questionnaire had a unique ID number printed upon it that was used to ascertain the gender, ethnicity and age of the participant, as well as the geographic region in which they lived and the ACORN category of their postcode. Participants were

explicitly given the option of removing this number if they wanted to complete the survey but did not wish to share that particular information.

As each survey was returned the data was entered into an SPSS spreadsheet. Approximately three months after the surveys were initially posted it was decided that any further responses would not be inputted. Only two surveys were returned after this deadline and were therefore excluded from the analysis. Data was analysed using SPSS. If any data relevant to an analysis was missing that participant was excluded from that particular analysis.

Materials

The questionnaire can be found in full in **appendix A**. There are five main sections, which are now discussed in greater detail.

Academic achievement items:

This section of the survey underwent substantial changes following the pilot. Participants self-reported the levels they achieved for English, mathematics and science at key stage 2 in a table. Participants were also given 16 blank spaces in which to self-report their GCSE subjects and grades. The GCSE results were transformed into a tariff score whereby grades were assigned a score of one to eight (With 'A*' being 8 and 'G' being 1) and the best ten scores were summed.

The issue of how tariff scores were generated merits further discussion as it required substantial consideration. Converting a grade into a point score is not uncommon (A-level grades are often converted into a point tariff for the purposes

of university admission) but how many GCSEs to include in the calculation for the tariff score and how to deal with individual differences in the number of GCSEs taken are more contentious issues. Although ten GCSEs is a high number for consideration, this was deemed appropriate given the high ability of the population. GCSE grades are a measure of achievement rather than potential and although a minority of students would have taken fewer than ten GCSEs it is important to note that, in the case of this study, the concern is with actual achievement rather than potential achievement. The student who *could* have achieved ten ‘A*’ grades if they’d taken ten exams is not easy to validly quantify. By using a higher number of grades for the tariff, thus making the highest scores harder to attain, it is likely that ceiling effects will be reduced, which is important given the highly able sample (ceiling effects were problematic at the pilot stage).

Academic achievement goal items:

Participants completed Grant & Dweck’s (2003) 18-item achievement goals measure, responding on a 4 point Likert type scale. Response to the 18 statements examines the importance that each respondent places on six types of achievement goal (three statements measure each goal). The statements were placed in a random order to minimise question repetition and maintain respondents’ interest. The items were originally designed to explore six types of achievement goal:

- *Outcome*: The goal is to ‘do well’ in courses and to get good grades (e.g. ‘I really want to get good grades in my classes’).
- *Ability*: The goal is to demonstrate high intellectual ability (e.g. ‘one of my important goals is to validate my intelligence through my schoolwork’).

- *Normative outcome*: The goal is to get better grades than peers (e.g. ‘it is very important to me to do well in my courses compared to others’).
- *Normative ability*: The goal is to demonstrate greater intelligence than peers (e.g. ‘in school I am focussed on demonstrating that I am smarter than other students’).
- *Learning*: The goal is to increase knowledge and learn new skills (e.g. ‘in my classes I focus on developing my abilities and acquiring new ones’).
- *Challenge-mastery*: The goal is to master challenging work (e.g. ‘I seek out courses that I will find challenging’).

This study will include a factor analysis to judge the appropriateness of this six-factor solution. Grant & Dweck (2003) also performed a factor analysis and found that the measure broke down into four types of goal: Mastery goals (learning & challenge mastery); Ability goals, Outcome goals and Normative goals (normative-ability and normative-outcome). Each of these factors had good internal reliability, with α -levels ranging between .91 and .92.

There are several achievement goal measures so it is important to consider the reasons for selecting Grant & Dweck’s (2003) instrument. As described in the literature review (p.44) there is some debate with regard to how many distinct types of goal orientation should be measured for academic achievement contexts. The chosen measure is notable in that it does not measure performance-approach and performance-avoidance goals (e.g. Elliot & Church, 1997), instead dividing performance-approach goals into ‘ability’ and ‘outcome’ goals. Also problematic is that Grant & Dweck’s (2003) instrument was largely explorative. It was

designed to explore factor structure rather than to measure the individual elements and was used to confirm ‘ability’ and ‘outcome’ goals as distinct goal types.

Despite these considerations it was decided that this measure was the most appropriate for this study for four reasons. Firstly, this study does not set out to explore the approach/avoidance element of achievement goals directly – the objective is more to gain a valuable oversight of the relationship between achievement goals, theories of intelligence and academic achievement for gifted and talented students. Secondly, the fact that Dweck’s work has used this measure previously is important because it is compatible with the implicit theory of intelligence measure and comparable with Dweck’s main body of work. Thirdly, the instrument incorporates an extrinsic motivation element to achievement goals because it separates the intrinsic elements of performance goals (ability goals – the objective of demonstrating high ability) from the extrinsic elements (outcome goals – the objective of achieving the tangible reward of a good grade). Finally, the instrument attempts to quantify normative goals, which could potentially provide useful data with regard to self-concept. Perhaps, for example, holding normative goals is related to an individual’s peer relationship self-concept.

Implicit theory of intelligence items:

Participants completed Dweck’s (2000) 6-item intelligence theory measure, responding on a 6 point Likert type scale. Three of the items pertain to entity theories, with participants responding to questions such as: ‘*you can learn new things but, but you can’t really change your basic intelligence*’, while three of the items are about incremental theories, for example: ‘*you can always directly*

change how intelligent you are'. The scores are averaged and each individual's position mapped on to an incremental-entity continuum of implicit theory of intelligence. Over a series of studies Dweck, Chiu & Hong (1995) found the instrument to have good internal reliability ($\alpha = .94/.98$) and good test-retest reliability ($\alpha = .80$).

Although this instrument is a commonly used and reliable measure of theory of intelligence there are several issues to consider, both in the decision to use it and with regard to what form of the instrument to use. Dweck (2000) states that this version of the instrument is most suitable for use with children aged 10 and above and suggests the use of a different version with adults, a version which is essentially the same but contains slightly more advanced vocabulary and eight rather than six items (see Dweck, 2000, p.178). It is arguable that the older students in the sample (16-17 years) may have been better suited to the adult version of the scale given their high ability. Despite this, the version for younger students was selected for both age groups in order to make comparisons by age group possible. Although the language is rather basic and older students could probably have understood the adult version it is important that both age groups complete the same measure and it is possible that the younger students would have struggled to understand the 'adult' version of the scale.

Another issue is that the measure usually only incorporates the three entity items rather than all six items. This is because, when both entity and incremental items are presented together, younger participants can become biased towards incremental responses (Dweck 2000; Dweck, Chiu & Hong, 1995). Dweck, Chiu

& Hong (1995) describe incremental items as ‘highly compelling’ (p.270), suggesting that participants move towards incremental responses over time because they are social desirable (**see p.41**).

The decision was made to use the six item version of the scale for two reasons. Firstly, it is likely to be statistically more reliable – the inclusion of more items should increase the α -level. Secondly, there was concern that including only entity items would not balance the measure. The entity items allow you to agree or disagree with statements about one end of the incremental-entity continuum and it seems inappropriate not to balance this by also allowing participants to agree or disagree with incremental items. This approach also has the advantage of allowing the validity of the continuum argument to be checked as it could potentially identify students high or low in both incremental and entity theories (though this is theoretically unlikely).

It is worth discussing the continuum idea a little further. This study primarily uses the theory of intelligence measure under the assumption that individuals are not simply entity, incremental or neither but actually lie somewhere along a continuum that ranges from strong entity beliefs to strong incremental ones. Other studies have also chosen not to categorize the theory of intelligence data (Leondari & Gialamas, 2002; Kennett & Keefer, 2007), though there is some debate on the matter (Dupeyrat & Mariné, 2005). Issues regarding the measurement of theories of intelligence are also discussed in **chapter II (p.41)**.

Despite this theoretical standpoint, this thesis, for general descriptive purposes and simple analyses, occasionally dichotomizes the data. In these cases the score is averaged, as with the continuum approach, but individuals with scores of between 1 and 3 are categorized as incremental theorists and those with score of between 4 and 6 as entity theorists. This is in line with the previous literature on implicit theories of intelligence (Dweck, Chiu & Hong, 1995).

Self-esteem & self-concept items:

Participants completed Muijs' (1997b) self-concept measure. Respondents use a four point scale to indicate their level of agreement with each of 32 statements pertaining to general self-concept (self-esteem) and seven different types of domain specific self-concept. The breakdown of these measures is as follows:

- *General self-concept*: This refers to 'global' self-esteem; a general feeling of self-worth and liking of oneself (6 items – e.g. 'I'm happy with the way I live my life')
- *Academic self-concept*: This aspect of self-concept refers to how highly an individual rates their own academic abilities (4 items – e.g. 'My teachers think I'm clever').
- *English (subject) self-concept*: This refers to how highly an individual rates their own ability in the academic subject of English (4 items – e.g. 'I'm one of the best in my class at English').
- *Maths (subject) self-concept*: This refers to how highly an individual rates their own ability in the academic subject of mathematics (4 items – e.g. 'I often don't understand maths').

- *Parental relationship self-concept*: This refers to how well an individual feels they get on with their parents (3 items – e.g. ‘I don’t like spending time with my parents’).
- *Peer relationship self-concept*: This refers to how well an individual feels they get on with other students in their year (4 items – e.g. ‘I find it easy to make friends’).
- *Physical self-concept*: This refers to how highly an individual rates their ability at playing sports and performing physical activities (3 items – e.g. ‘I enjoy doing sports’).
- *Body image self-concept*: This refers to how physically attractive an individual considers themselves (4 items – e.g. ‘I don’t like the way I look’).

A self-concept score is generated by adding numeric values (1-4) for the relevant set of items. A total of 12 items require this score to be reversed because of negative phrasing (e.g. ‘I don’t like the way I look’ for body image self-concept).

This measure works on the theory that there is one general measure of ‘global’ self-esteem and multiple domain specific self-concepts that, though often correlated, are independent (Byrne, 1984; Marsh, 1986). There are many measures of self-esteem and self-concept available (Blascovich & Tomaka, 1991), so the reasons for selecting this measure require further explanation. Firstly, there may be instruments for measuring self-esteem that are far more prevalent in psychological literature (Butler & Gasson, 2005), but this study seeks to explore a specific age group in a specific context. Muijs (1997b) instrument has been piloted and used previously for research with members of NAGTY (Mazzoli,

Campbell & Muijs, 2006), and is therefore suitable for gifted and talented students of both age groups in this sample.

Perhaps even more beneficial is that the instrument was developed for use within the school context, and explores domains of self-concept that are relevant to students' experiences of school life. The subscales that it includes are designed to measure domains of self-concept that are specific to secondary school and are relevant to achievement goals and academic performance (for example academic self-concept, and subject specific self-concepts for English and mathematics). These subscales will allow this research to explore relationships between self-concept, goals and achievement within the specific context of the school to a greater extent than more general or global measures of self-esteem - they allow the data to be explored in a more nuanced and contextualized way.

Open questions about Motivation:

The three open questions used in the pilot were maintained with no alterations. These questions were designed to offer participants an opportunity to provide information about their theories of intelligence and sources of motivation which were not prescribed upon them through pre-existing measures. The first two questions '*Please write a few sentences about the type of things that motivate you to work hard at school*' and '*Please write a few sentences about the type of things that put you off working hard at school*', were specifically designed to openly draw on participants contextualized motivational experiences. This allowed participants to move away from the principle focus of the study (if they wished to) and to discuss different sources of intrinsic and extrinsic motivation, meaning the

researcher could gain some insight into the perceived importance of theories of intelligence within the broader concept of motivation.

The third of these open questions was *‘Please write a few sentences about what you understand by the term ‘intelligence’ and where you think intelligence comes from’*, and was designed to provide a direct qualitative comparison between the theories of intelligence identified by Dweck’s measure and those that are consciously articulated. It may be that Dweck’s measure over-simplifies intelligence theories and important detail and nuance in a participant’s beliefs are hidden. Another useful element to this item is the potential it provides for identifying any distinction that the participants make between the definition of intelligence and explanations for where it stems from. Dweck’s measure requires these two ideas to be merged but it may be that participants keep them distinct.

Participants

A total of 417 participants returned the final questionnaire (34% response rate).

Of all participants 57% were female, and a chi-square test suggests that females were more likely to return the survey than males, $X^2(1) = 8.681, p = .003$.

Additionally 60% of all participants were 11-12 years old (40% 16-17 years old), which is again more than would be expected by chance given the stratified sampling, $X^2(1) = 18.151, p < .001$. There was however, no evidence to suggest that gender distribution was unequal between age groups, $X^2(1) = 1.435, p = .235$.

No such issues of representation were found with regard to geographic region.

Table 1 displays the percentage of respondents from each of the nine geographical regions in the UK. The sample was stratified so that an equal number of surveys went to students in each of the nine regions and there is no evidence to suggest that participants from a particular region were more or less likely to respond, $X^2(8) = 5.549, p = .698$. The ethnic background of the sample was also explored and the data compared to that obtained by Campbell et al. (2007), who analysed the social and economic background of NAGTY members.

Table 2 shows the breakdown of NAGTY members by ethnicity that they obtained along with the ethnic characteristics of this sample and of the secondary school aged population living in England (according to Campbell et al., 2007).

Table 1: Distribution of participants by geographic region of the UK (%)

East Midlands	12.8
East of England	12.0
London	11.5
North East	12.0
North West	12.8
South East	10.0
South West	9.5
West Midlands	9.8
Yorkshire & Humber	9.5

Table 2: Distribution of participants by ethnicity compared to NAGTY and national distributions (%)

	Population	NAGTY	Sample
White British	84.4	83.6	83.8
White Irish	0.4	0.7	0.7
White Other	2.1	1.4	1.2
White & Black Caribbean	0.7	0.6	0.5
White & Black African	0.2	0.3	0.5
White & Asian	0.4	1.0	1.2
Other Mixed	0.7	0.8	1.0
Indian	2.5	3.5	5.2
Pakistani	2.4	0.9	2.7
Bangladeshi	1.0	0.3	0.2
Other Asian	0.6	0.9	0.2
Black Caribbean	1.5	0.5	0.2
Black African	1.4	0.6	0.7
Other Black	0.4	0.1	0.2
Chinese	0.4	1.3	0.2
Other	-	1.5	0.0
I would prefer not to say	-	-	1.0

The respondents were broadly representative of NAGTY members as a group with regard to ethnic background, but there were a few anomalies. Indian and Pakistani ethnicities appear slightly over represented in the sample, while Chinese and other Asian ethnicities appear under represented. Because of the low ‘expected’ frequencies, chi-square analyses could not be carried out to check for statistical significance. However this also means that the numbers in these cells are low enough that only a very small number of extra participants in that group could inflate the percentage. For this reason these findings are not a particular issue with regard to how representative the sample is.

The ethnicity data does not hold enough variability to be used in further analysis; there simply are not enough participants from each ethnic background. Although it would be possible to group particular ethnic groups together for the purpose of statistical analysis (for example, comparing ‘Ethnic Minorities’ to those in the ‘White British’ category) it was decided that this was not appropriate. Crudely grouping multiple ethnic groups together would not adequately account for the diversity of these groups and would raise issues of validity with regard to any emerging statistical trends. The participants were also similar to NAGTY members as a whole with regard to socio-economic status (as defined by ACORN postcode category). **Table 3** shows this distribution, again using the figures presented by Campbell et al. (2007) as a basis for comparison.

Table 3: Distribution of participants by ACORN category compared to NAGTY and national distributions (%)

	Population	NAGTY	Sample
1. Wealthy Achievers	26.0	44.0	45.8
2. Urban Prosperity	8.0	9.0	10.2
3. Comfortably Off	27.0	28.0	28.5
4. Moderate Means	16.0	9.0	8.9
5. Hard Pressed	23.0	8.0	6.6

NOTE: Those identified as gifted and talented and admitted into NAGTY tend to be from the more affluent ACORN categories. This is an issue that is discussed in greater detail by Campbell et al. (2007).

Achievement data

This section will first explore the key stage 2 data, which showed clear ceiling effects. Level 5 is the highest that is usually attainable at key stage 2 and most students attained this in English (84%), Maths (89%) and Science (89%). A minority attained level 4 in each of the subjects: English (11%), Mathematics (5%) and Science (4%) and no students received less than level 4. This demonstrates a lack of variance in the data but it does suggest that the sample succeeds in representing the population that it seeks to explore - exam performance at key stage 2 was clearly very good, as would be expected from the gifted and talented.

A minority of students had apparently been accelerated beyond the normal examination structure as they reported receiving levels of 6, 7, or even 8 (when the maximum is usually level 5). This was most likely in Science (7%) followed by Mathematics (6%) and English (5%). These scores appear to 'break the ceiling', suggesting a few individuals may have been entered early for certain exams, but they should be interpreted with caution. There is some evidence to suggest that the older students are disproportionately more likely to report these higher levels at Key Stage 2 than the younger ones; English: $X^2(4) = 13.681, p = .008$, Maths: $X^2(5) = 27.840, p < .001$, Science: $X^2(4) = 23.230, p < .001$. It is possible that this is because a minority of older students reported scores from key stage 3 rather than key stage 2. The older students would have taken the key stage 3 exams more recently than the Key Stage 2 ones, and therefore the results may be more salient in their memory, causing them to accidentally misreport their grades. Given the strong ceiling effects in the data (resulting in a lack of variance) and the

validity issues regarding the self-reported data from the older participants it is inappropriate to use this measure for further analysis.

The data for GCSE (Key Stage 4) achievement applies only to the older students who participated (N=165). A ‘GCSE tariff’ score was calculated by coding each grade and adding the best ten to attain a score out of 80 (discussed on **p.110**). As with the key stage 2 achievement data there were significant ceiling effects. The tariff score ranged between 53 and 80, had a mean of 72.91, a standard deviation of 6.06, and was statistically non-normally distributed, $D(162) = .123, p < .001$. The distribution of tariff scores is displayed in **figure 4**. Despite the skewed distribution and clear modal peak at the highest possible score, it appears that there is suitable variance within the tariff score for statistical analysis. A range of different GCSEs were listed by the participants, with all participants taking mathematics and English language, providing the potential for subject by subject comparisons. **Table 4** presents information about the top 15 subjects taken and the grades attained.

Figure 4: Histogram of GCSE tariff scores (N = 165)

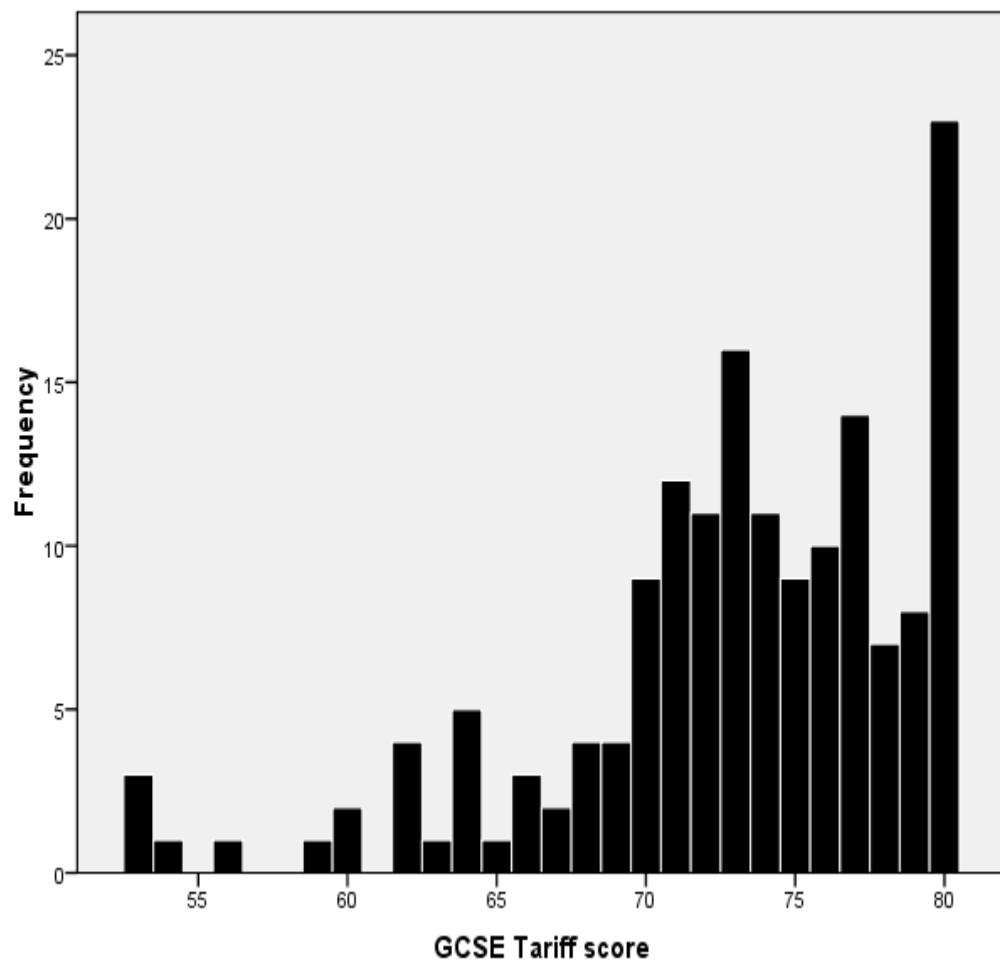


Table 4: GCSE grades by subject

Subject	No. Taken	Grade attained (%)			
		A*	A	B	C – U
English Language	165	38	42	18	1
Mathematics	165	53	33	14	1
English Literature	161	45	36	14	4
Religious Education	116	53	35	11	1
Science (Double Award)	109	66	22	8	4
French	106	36	42	16	7
History	90	63	27	7	3
Design & Technology	89	42	46	7	6
ICT	82	23	44	16	17
Geography	77	56	38	5	1
Physics	56	45	36	18	2
Biology	55	49	38	11	2
Chemistry	55	51	40	7	2
German	50	26	46	20	8
Art & Design	47	36	45	4	15

Summary

The questionnaire was carefully constructed and piloted in order to most effectively answer the research questions of this thesis. A number of changes were made to the piloted design based on the feedback of the participants in an effort to make it as attractive and accessible as possible. Although a number of measures could have been selected for theory of intelligence, achievement goals and self-concept, those that were decided upon were considered the most relevant, valid and reliable based on the literature. Response rate was slightly skewed such that females were more likely to respond than males and younger students (11-12 years old) more likely to respond than older students (16-17 years old), but this skew was not substantial enough to alter the analyses that could be performed. There were substantial ceiling effects in the achievement data such that there was insubstantial variance for analysis of the key stage 2 results. However the data for GCSEs, though still showing ceiling effects, was suitable for analysis. Overall the survey should generate substantial data, allowing for detailed analysis.

Chapter IV: Implicit theories of intelligence and Dweck's model

This chapter seeks to quantitatively explore the relationship between implicit theories of intelligence, gender, age group, socio-economic status, achievement goal orientations, self-concept and academic achievement. The objective is to test Dweck's model with regard to gifted and talented students, exploring how appropriate it is for use with this group. There are five main sections to this chapter. The first section describes factor analyses that were carried out on the measures of theory of intelligence and achievement goals to ascertain whether the items were representative of the concepts being explored. The second examines the descriptive data for each of the main measures and checks their reliability. The third section examines the data for implicit theories of intelligence and the relationship this measure has with achievement goals and academic achievement in an effort to test Dweck's model. The fourth section looks at the relationship that self-concept has with the other variables and, finally, there is a fifth section which provides a detailed discussion about all of the findings, framed by the literature. This final section is critical, identifying and discussing the limitations of the research as well as considering the wider implications of the findings.

Factor analyses

The implicit theories of intelligence measure and achievement goal measures were subjected to exploratory factor analysis (maximum likelihood) using direct oblimin rotation. This type of rotation was selected because it best accounts for variables that are likely to be correlated (Field, 2005). The reasoning for this, in the case of achievement goals, was that a general desire to achieve may mean a participant is likely to endorse multiple goals, causing the different achievement goals to correlate to some extent. The type of rotation used was not considered important for theories of intelligence because only a single factor was considered likely to emerge.

Parallel analysis was employed along with scree plots to establish how many factors should be extracted for each instrument. Parallel analysis identifies factors that have eigenvalues that are significantly higher than those that would be expected to occur by chance (Wood, Maltby, Stewart & Joseph, 2008). SPSS syntax written by O'Connor (2000) was used to simulate 10,000 random data sets for each of the variables to ascertain the first 15 highest eigenvalues in 95% of the random data sets. Each eigenvalue generated by the factor analysis with the *actual* data that is greater than these chance values suggests one discrete factor. The point of inflection on each scree plot was also examined to cross-check this. The two factor analyses are now discussed individually.

For the achievement goals measure, the SPSS syntax (O'Connor, 2000) was used to simulate 10,000 random data sets of 18 variables and 379 participants (which matches with the parameters of the actual analysis). In 95% of these datasets the

first few eigenvalues were equal to or less than 1.40, 1.32, 1.26, 1.21 and 1.17. Only the first three eigenvalues in the actual data surpassed these chance values (with eigenvalues of 6.47, 3.03 and 1.44). This suggests that three goal factors rather than six should be extracted. The KMO statistic and Bartlett's test of sphericity suggest that the data was suitable for factor analysis according to the criteria suggested by Field (2005). **Table 5** shows the factor loadings for the 18 goal items, suppressing loadings less than .3 to ease interpretation.

The first factor was labelled *normative goals* (factor 1) due to the high loadings on the items that were originally designed to ascertain 'normative outcome' and 'normative ability' goals. The *normative goals* factor accounted for 30.9% of the variance. The second factor was labelled *learning goals* (factor 2) as it appears to represent an amalgamation of the 'learning' and 'challenge-mastery' items. The *learning goals* factor accounted for 17.1% of the variance. The final factor to emerge was labelled *performance goals* (factor 3) on the grounds that it appears to constitute items that were designed to represent both the 'outcome' and 'ability' goals. The *performance goal* factor accounted for 5.0% of the total variance.

Most items only loaded substantially to a single factor, but in two cases items loaded on two factors (items 7 and 13 in **table 5**). Both items were included in the analyses as the cross-loadings can be accounted for through the use of factor scores. In conclusion the goal instrument seems to be measuring three distinct factors: normative goals, learning goals and performance goals. Factor scores were generated to represent each of the three emerging goal types and these factors will be used to explore achievement goals in subsequent analysis.

Table 5: Pattern matrix for achievement goal factor analysis

	Factor		
	1	2	3
1. When I take a course in school, it is very important for me to validate that I am smarter than other students	.948		
2. In school I am focused on demonstrating that I am smarter than other students	.912		
3. It is very important to me to confirm that I am more intelligent than other students	.898		
4. A major goal I have in my courses is to get higher grades than the other students	.849		
5. It is very important to me to do well in my courses compared to others	.804		
6. I try to do better in my classes than other students	.600		
7. In school I am focussed on demonstrating my intellect	.356	.320	
8. I seek out courses that I will find challenging		.720	
9. I really enjoy facing challenges, and I seek out opportunities to do so in my courses		.689	
10. It is very important to me to feel that my coursework offers me real challenges		.639	
11. In school I am always seeking opportunities to develop new skills and acquire new knowledge		.557	
12. In my classes I focus on developing my abilities and acquiring new ones		.547	
13. I strive to constantly learn and improve in my courses		.465	.313
14. I really want to get good grades in my classes			.715
15. It is very important to do well in my courses			.635
16. A major goal I have in my courses is to perform really well			.607
17. It is important for me to be able to confirm my intelligence through my schoolwork			.426
18. One of my important goals is to validate my intelligence through my schoolwork			.410

Key:

Factor 1 = Normative goals

Factor 2 = Learning goals

Factor 3 = Performance goals

The implicit theory of intelligence measure (six items) was also subjected to factor analysis. As expected, according to parallel analysis and the scree plot only one factor could be extracted from the implicit theories of intelligence scale (with an eigenvalue of 3.76). This factor (theory of intelligence, incremental → entity) explained 55.1% of the variance. The KMO statistic and Bartlett's test of sphericity suggested that the data was suitable for factor analysis, though loadings could not be explored given the existence of only one factor. It appears that the scale is measuring a single dimension and is internally consistent. It therefore seems reasonable to suggest that this means that endorsing one belief leads to rejection of the other.

Factor analysis was not carried out for the self-concept measure for two reasons. Firstly, the measurement of self-concept is not fundamental to Dweck's model. The measure was included to enrich the general understanding of motivation in gifted and talented students rather than as a technical exercise in testing the coherency of the model and so the data generated was not used as vigorously. Secondly, the Muijs' (1997b) self-concept measure has been widely used within NAGTY research and so is considered a valid method for exploring various facets of self-concept with the gifted and talented. With the breakdown of the measures established it is now possible to explore the data they produced in more detail.

Descriptive data and reliability for measures

The implicit theories of intelligence score produces data that ranges from one (strong incremental theory) to six (strong entity theory) and this score will be used as a continuous variable for most of the analysis. **Figure 5** displays a histogram of scores on the theory of intelligence measure, illustrating the tendency for the respondents to favour incremental theories of intelligence (a positive skew). The data on theory of intelligence was distributed in a significantly non-normal way according to the Kolmogorov-Smirnov (K-S) test, $D(406) = .109, p < .001$. This non-normality is not of major concern for three reasons. Firstly there is a large sample size and this makes the K-S test more likely to detect deviations in normality (Field, 2005, p.95), secondly because the histogram itself exhibits a normal, if skewed, curve and finally because there is substantial variance in the data for performing statistical analyses.

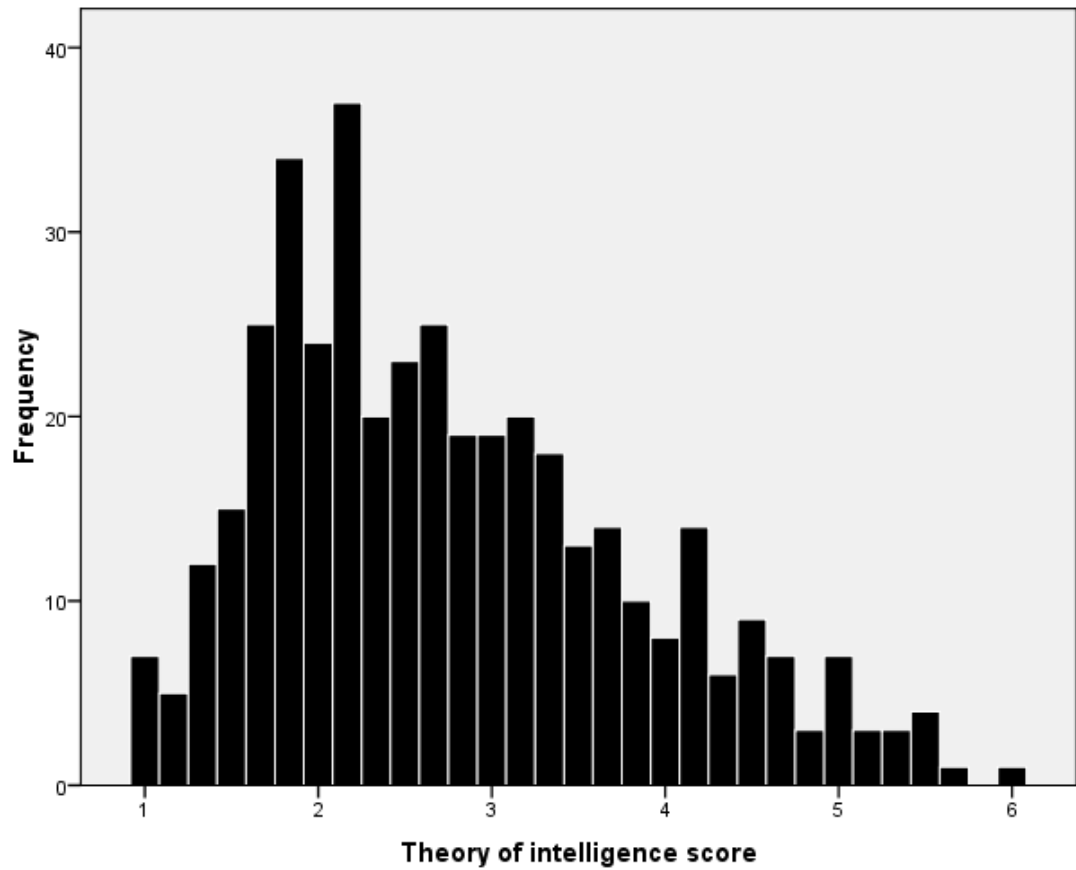
The distribution of the factor scores for Normative goals $D(379) = .068, p < .001$, Learning goals, $D(379) = .074, p < .001$ and Performance goals, $D(379) = .161, p < .001$, all exhibited statistical non-normality. As in the case of the theory of intelligence measure this is not necessarily problematic as the lack of normality detected in the K-S test appears likely due to skew and the large sample sizes rather than a different or random type of distribution. **Figure 6** shows the distribution of factor scores for learning goals. In this case the skew is a negative one, indicating participants' overall preference for endorsing learning goals. Despite the finding that participants generally hold learning goals there is still substantial variance in the data for analysis and a curve that appears to be normal. The performance goal factor score distribution demonstrated a similar curve but

one that was even more skewed towards endorsing the goal, suggesting that performance goals are extremely popular. The Normative goal score distribution displayed the most variance suggesting the greatest diversity in response. The distribution does not appear to be normal and is displayed in **figure 7**.

Non-normality of data, particularly negative skew, was also an issue for the measures of self-concept. General self-concept, mathematics self-concept and English self-concept all displayed non-normality, a result from negative skew and ceiling effects (see **table 6**). **Figure 8** demonstrates this strong skew and ceiling effect for the general self-concept (which could be labelled as self-esteem). There is substantial variance between participants which means that statistical analysis can be performed, however the distribution is clearly not normal as the mode is at the ceiling.

The other self-concept measures all produced data that was more variable and produced distributions that appeared normal, but in all cases these distributions were statistically non-normal. **Table 6** displays the K-S statistics for all self-concept measures while **figure 9** shows the distribution of scores for peer self-concept to exemplify that the data may not be statistically normal but still displays normal characteristics. As with the achievement goal factors, negative skew was again apparent, though to a lesser extent. Generally the respondents appeared to be very positive about themselves in multiple domains, particularly with regard to their general and academic self-concepts, but there was enough individual difference within each measure for the purposes of statistical analysis.

Figure 5: Histogram of theory of intelligence scores (N = 406)



Note: Lower scores correspond to incremental theories, higher scores to entity theories of intelligence. For the dichotomized version scores of three and below represented an incremental theory, scores of four and above an entity theory and scores between three and four were classified as 'neither'.

Figure 6: Histogram of factor scores for learning goals (N = 379)

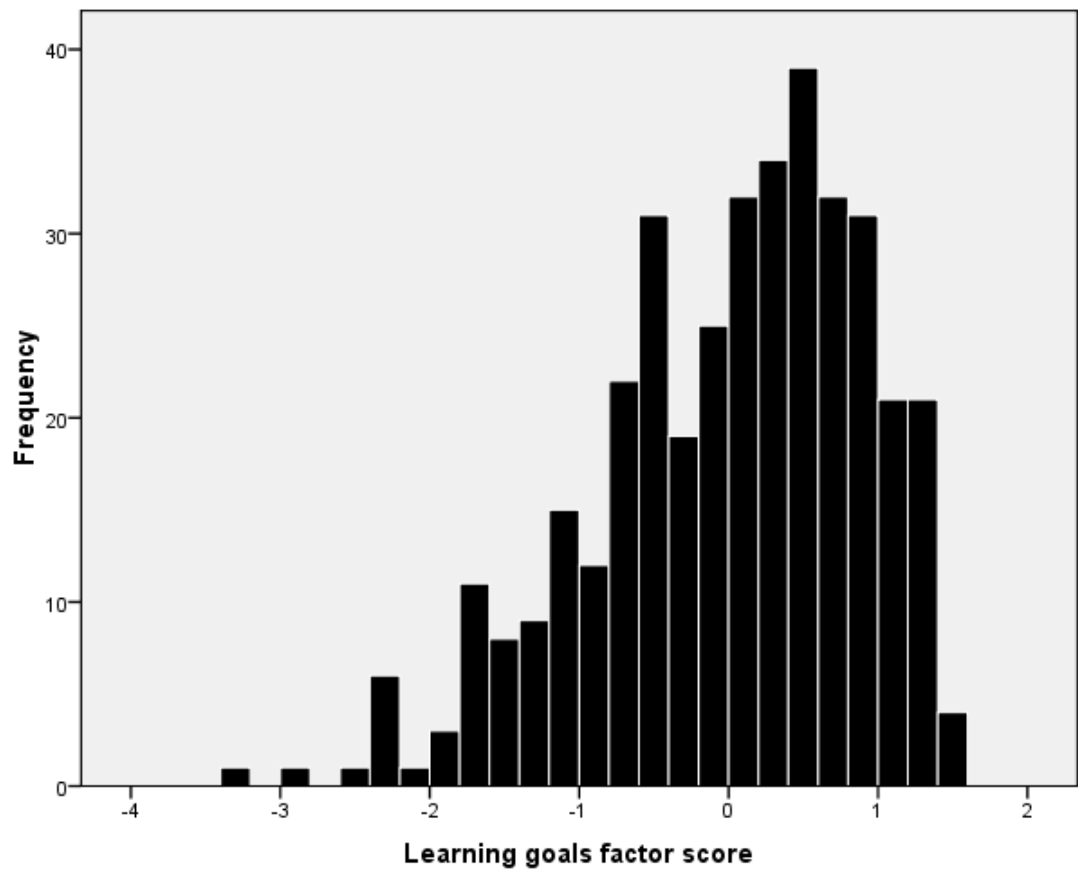


Figure 7: Histogram of factor scores for normative goals (N = 379)

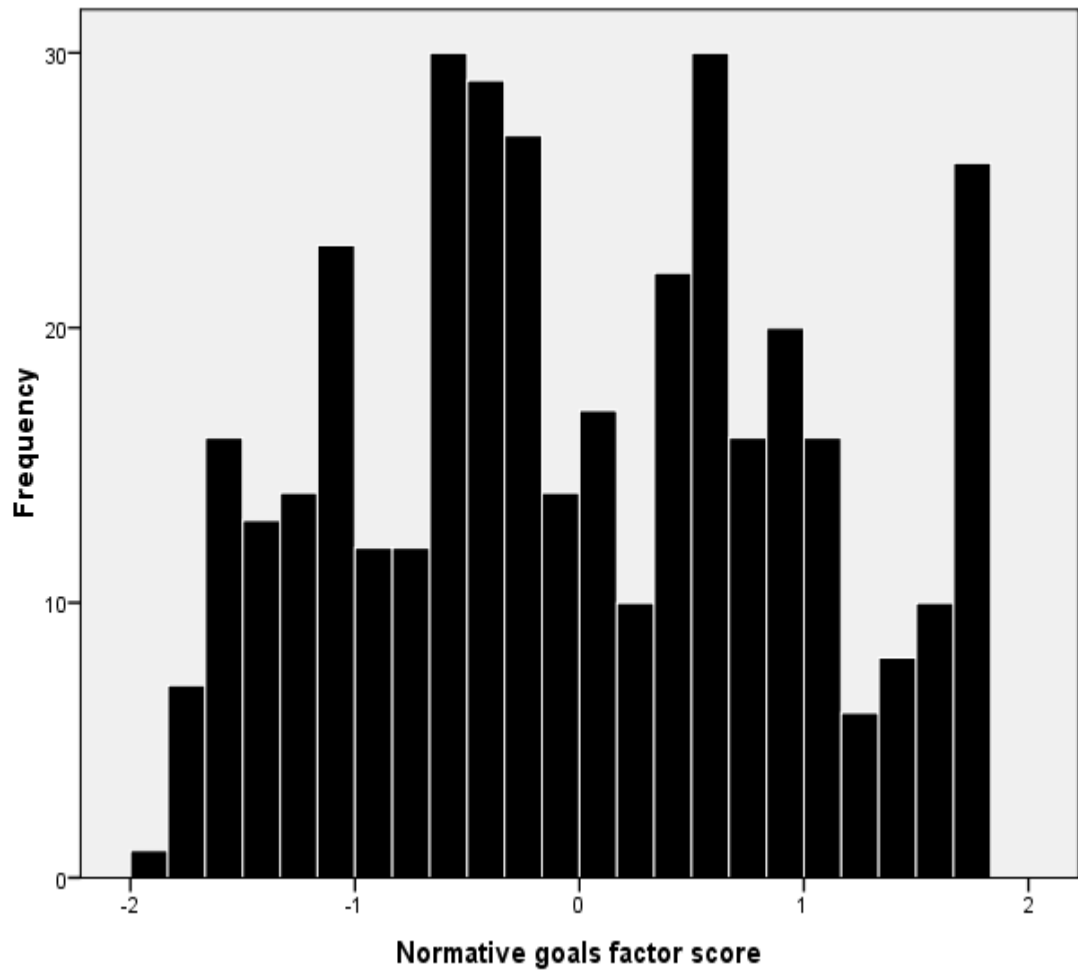


Figure 8: Scores for general self-concept by frequency

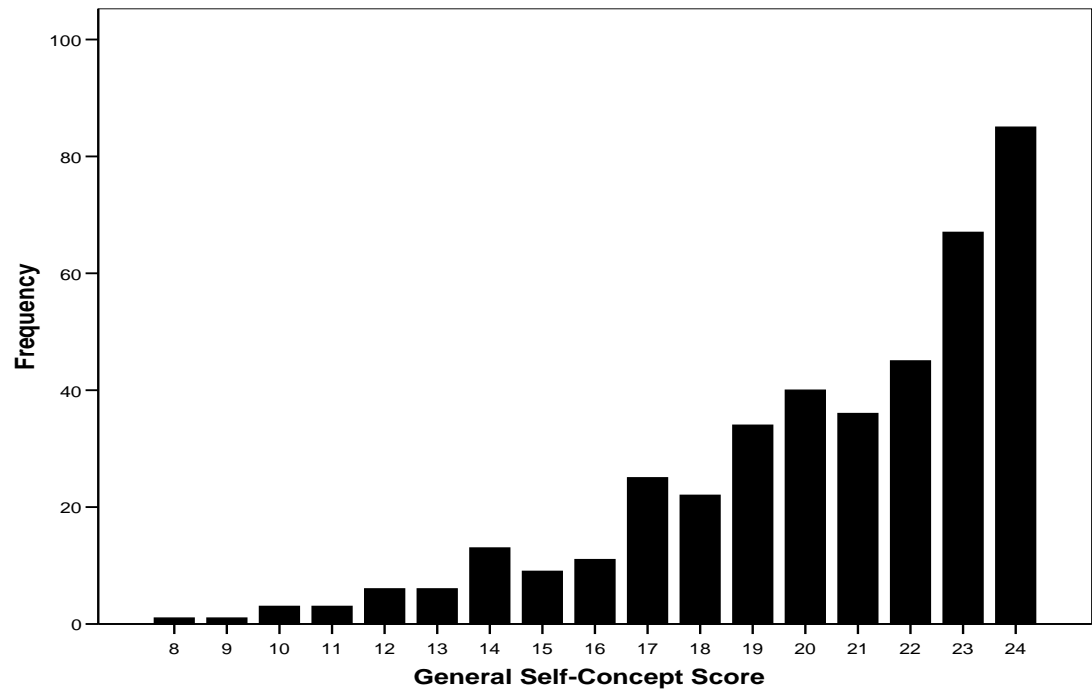
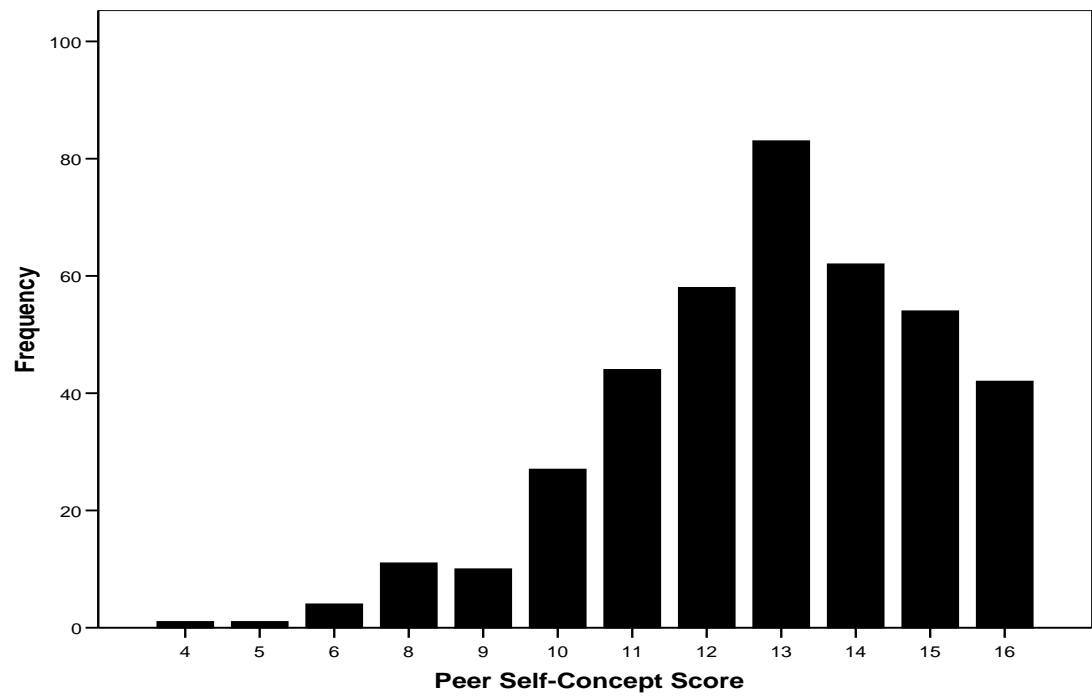


Table 6: Kolmogorov-Smirnov tests of normality for self-concept measures

Self-concept	Statistic	DF	Sig.
General self-concept	.160	373	.000
Academic self-concept	.134	373	.000
Mathematics self-concept	.205	373	.000
English self-concept	.153	373	.000
Parental relationship self-concept	.171	373	.000
Peer relationship self-concept	.141	373	.000
Physical self-concept	.183	373	.000
Body image self-concept	.149	373	.000

Figure 9: Scores for peer self-concept by frequency



The measures of implicit theory of intelligence, achievement goals and self-concept were tested for reliability, with each sub-scale tested individually. **Table 7** displays the reliability of each item, both when using data for all students and when using data only for the older students (as was the case when analyses were carried out using academic achievement data). These reliabilities are variable but there are none which appear unacceptable as all α -levels are greater than .7. For a few of the scales a single item could be removed to marginally increase the α -level but the increases were very small and not considered substantial enough to warrant the items being removed. These findings suggest that the scales used are reliably measuring a single concept, both for the whole sample and with regard to only the older students.

Overall participants consider themselves to be highly driven by the three achievement goals and they exhibit very positive levels of self-concept. These findings exhibit ceiling effects and non-normality which complicates data analysis to an extent but not seriously. The main measures were all shown to be reliable and, with the exception of the key stage two data, there is substantial variance for exploring individual differences. The next section begins to explore these differences in detail.

Table 7: Cronbach alphas for all students and for older students only

Measure	Items	α (all)	α (older)
Theory of Intelligence	6	.914	.882
Normative Goal	7	.922	.922
Learning Goal	7	.805	.829
Performance Goal	6	.770	.766
Global SC	6	.870	.841
Academic SC	4	.745	.765
Maths SC	4	.872	.845
English SC	4	.839	.836
Parent SC	3	.791	.765
Peer SC	4	.724	.763
Physical SC	3	.911	.902
Body SC	4	.834	.812

Implicit Theories of Intelligence

This section will explore how scores on the implicit theories of intelligence measure related to the measures of academic achievement, achievement goals and self-concept, paying particular attention to Dweck's model. Primarily the theory of intelligence score will be used as a continuum for this thesis but it can be dichotomized for the purposes of summation, such that scores of three and below are categorized as 'incremental' and four and above as 'entity' (with those scores between three and four being classified as 'neither'). When the implicit theory of intelligence data is dichotomized in this way, the gifted and talented students of the sample are more likely to hold an incremental theory of intelligence (64%) than an entity theory (16%) with the remainder of those who responded falling into neither category (20%).

One of the issues that emerged from the literature review was whether the measure of theory of intelligence caused a bias towards incremental responses due to incremental items being more attractive than entity items (Dweck, Chiu & Hong, 1995, **see p.41**). It is possible to explore this issue to a degree by comparing the data produced by the six item measure to that produced by only the three entity items and only the three incremental items. This comparison is made possible by the fact that the entity items were presented before the incremental items in the survey (see **appendix A**), with participants answering the entity questions first and then the incremental questions.

The scores produced by the six item measure ($M = 2.78$, $SD = 1.06$) were not significantly different either to those produced by only the three entity items ($M =$

2.81, $SD = 1.21$) or only the three incremental items ($M = 2.75$, $SD = 1.13$). The scores produced by these differing combinations of items were all positively correlated, with the six-item measure strongly related to only the entity items, $r = .911$, $p < .001$, and only the incremental items, $r = .898$, $p < .001$. The three entity items score showed a slightly weaker correlation with the three incremental items score, $r = .636$, $p < .001$, but the relationship was still relatively strong and positive. The data suggests that the use of all six items did not produce significantly different theory of intelligence scores compared to either the use of only the three entity items or only the three incremental items.

With the six item version of the measure confirmed as unbiased the continuous score that it generated was used for analysis. There was a tendency for the older children to score higher on the implicit theory of intelligence measure ($M = 3.02$, $SD = 1.10$) than the younger students ($M = 2.62$, $SD = 1.00$). This difference was statistically significant $t(328) = -3.74$, $p < .001$, but the size of the effect was not strong, $d = .38$. There was no apparent effect of gender, geographic region or ACORN category, with participants' implicit theories of intelligence apparently not related to these factors.

There were also some demographic differences with regard to achievement goal endorsement. The younger students were more likely to endorse learning goals ($M = .139$, $SD = .816$) than the older students ($M = -.189$, $SD = .990$), $t(304) = 3.43$, $p = .001$. The younger participants were also more likely to endorse normative goals ($M = .107$, $SD = .991$) than their older counterparts, ($M = -.146$, $SD = .941$), $t(377) = 2.51$, $p = .012$. There was also one gender difference, with males more likely to

endorse normative goals ($M = .193$, $SD = .975$) than females ($M = -.146$, $SD = .954$), $t(365) = 3.33$, $p < .001$. There were no statistically significant relationships between any of the achievement goals and either ACORN category or ethnicity.

Implicit theory of intelligence was negatively correlated with learning goals (whereby a higher score represented a stronger endorsement of the goal type), $r = -.250$, $p < .001$. Though statistically significant the strength of the correlation is rather weak. The correlation remains significant and of a similar strength even when the effect of age group is controlled, $r = -.223$, $p < .001$. Students became more likely to endorse a learning goal as their theory of intelligence became increasingly incremental.

Implicit theory of intelligence was also negatively correlated with endorsement of performance goals, $r = -.101$, $p = .052$, but was not statistically significant at the .05 level. When the effect of age group was controlled, the correlation was significant at the .05 level but was only very slightly stronger, $r = -.106$, $p = .041$. As theory of intelligence became increasingly incremental, favouring of performance goals increased. Implicit theory of intelligence and endorsement of normative goals were not significantly related in this sample, $r = -.037$, $p = .478$.

The participants' high endorsement of both learning and performance goals made it difficult to difficult to explore the relationship between achievement goals and theory of intelligence. To examine this relationship more closely participants were split into two groups based on their achievement goal scores; the first were those that had rated performance goals more highly than learning goals and the second

those that had rated learning goals more highly than performance goals. The groups emerged as exactly the same size, with 190 participants in each. There was a tendency for the participants who had rated performance goals more highly than learning goals to score higher on the implicit theory of intelligence measure ($M = 2.93$, $SD = 1.09$) than those had rated learning goals more highly than performance goals ($M = 2.66$, $SD = 1.02$). This shows that a preference for performance goals was linked to theories of intelligence that were more entity in nature. This difference was statistically significant $t(369) = 2.44$, $p = .015$, but the size of the effect was weak, $d = .026$.

Implicit theories of intelligence were negatively correlated with self-concepts for both parental relationship, $r = -.174$, $p < .001$, and peer relationship, $r = -.129$, $p = .011$. These correlations are weak and become even weaker, as well as not statistically significant at the .05 level, when the effect of age group was controlled, $r = -.103$, $p = .050$ (parental relationship self-concept), $r = -.092$, $p = .082$ (peer relationship self-concept). In both cases the more incremental theories were associated with more positive self-concepts. There were no other statistically significant correlations between theories of intelligence and each self-concept.

For only the older age group ($N=155$, excluding students missing key data), there was a positive correlation between implicit theory of intelligence and GCSE tariff score, $r = .181$, $p = .023$. **Figure 10** displays this relationship. This suggests that as intelligence beliefs move towards the ‘entity’ end of the scale tariff scores increase, though the correlation is rather weak and is influenced by ceiling effects and a restricted range of values. **Table 8** shows the correlations between the

theory of intelligence, goal orientation and achievement variables for the older students. Note that the number of students included in the analysis is reduced because of list-wise deletion – only data from participants that contributed to all relevant measures were included in the analysis. The three achievement goals are all significantly correlated with one another. The positive relationship between performance goals and learning goals is particularly strong, $r = .634, p < .001$. It is also important to note that the relationship between performance goals and theory of intelligence ceases to be statistically significant.

Along with GCSE tariff score, individual grades of A*-G (scored 8-1) in English language and mathematics were used as outcome variables. These scores were broken into three categories, ‘low’ for grades B and below, ‘medium’ for an A grade, and ‘high’ for an A* grade. This was because the majority of students achieved either an A or an A*. Mathematics achievement was correlated with theory of intelligence, $r = .179, p = .023$, such that individuals with relatively strong entity beliefs exhibited better mathematics grades. Mathematics grades were also correlated with normative goals, $r = .213, p = .007$ such that if normative goals were rated more highly mathematics grade was likely to improve.

A similar pattern was displayed in relation to performance in English. English achievement was not quite significantly correlated with theory of intelligence at the .05 level, $r = .147, p = .064$. As was the case with mathematics, stronger entity beliefs were associated with better English grades. English grades were correlated with performance goals, $r = .152, p = .054$ (note: not significant at $p < .05$) such that as performance goals were rated more highly English grade improved.

Figure 10: GCSE tariff scores by theory of intelligence (incremental to entity)

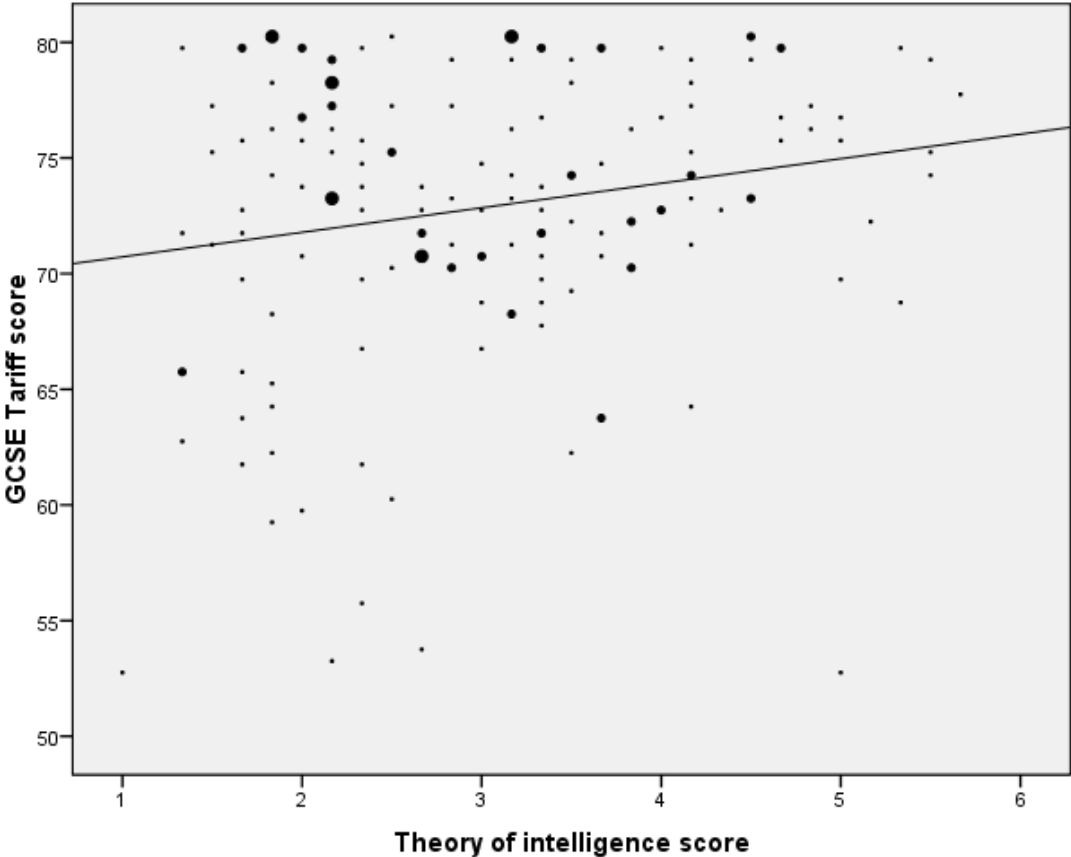


Table 8: Pearson-moment correlations among motivation variables and achievement (older students only)

	1	2	3	4	5
1. Theory of Intelligence	—				
2. Normative Goals	.112	-			
3. Learning Goals	-.209*	.266**	-		
4. Performance Goals	-.079	.318**	.634**	-	
5. GCSE Tariff	.181*	.142	.089	.195*	—

* $p < .05$

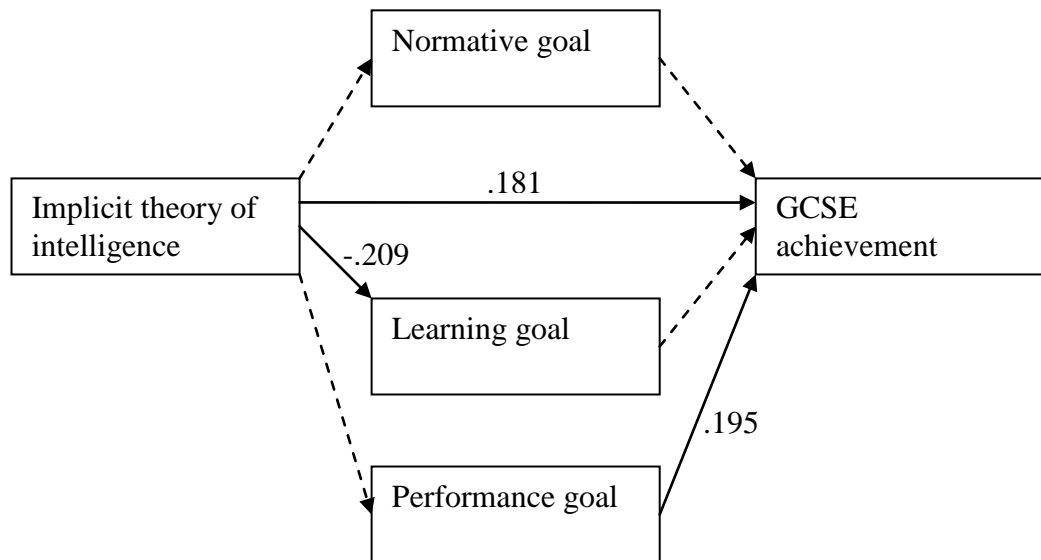
** $p < .01$

N=155

The data from the older students does not suggest that implicit theories of intelligence are mediated by the endorsement of any of the three achievement goals though it does suggest a direct relationship whereby if an individual is further towards the entity end of the continuum they achieve better examination results (though the relationship is not a strong one). Holding a performance goal does seem to be related to actual performance, while holding an incremental theory of intelligence is related to a stronger preference towards learning goals.

It was initially planned that mediation analysis or structural equation modelling would be performed on this data in order to establish how goals mediate the relationship between intelligence beliefs and actual achievement. However the data does not support the hypothesis that there is a clear path from intelligence beliefs to achievement via goal preference. **Figure 11** shows the hypothesized model. The dotted arrows show paths that were hypothesized but did not prove to be statistically significant, while the solid lines show statistically significant relationships and the strength of the correlation.

Figure 11: Hypothesised and actual relationships between theory of intelligence, achievement goals and academic achievement



Self-concept

This study will now briefly explore the self-concept data and how it relates to the three achievement goals and academic performance. It is not the objective of this thesis to explore the relationship between self-concept and gender, age, geographic region, socio-economic status and ethnicity in great depth. However, some of these variables may be significant to the analysis as they may be confounding or mediational and in these cases they are accounted for (see **chapter II, p.89** for research aims). For this reason it is important to briefly note the gender and age group differences. Males reported more positive Mathematical, physical and body image self-concepts. The younger participants had a tendency to report more positive self-concepts than the older ones, reporting significantly stronger self-concepts in all domains except academic self concept. The T-test statistics exploring these relationships are reported in **appendix B** - all of these tests are corrected for homogeneity of variance where they violate Levene's test.

It is also important to reiterate that there was strong negative skew in the data for nearly all of the self-concepts (see **p.135**). The students who responded to this survey generally have very positive self-concepts with many reporting the maximum positive score. This means that the variance that will be explored will largely reflect differences between participants at the top end of the scale (positive) and the middle of the scale (neither positive or negative). Very few participants had negative self-concepts.

Table 9 shows the correlations between the more academic achievement orientated self-concepts (academic, mathematics and English), general self-

concept and the three achievement goals. With the exceptions of the relationship between mathematics self-concept and performance goals and between general self-concept and normative goals there are statistically significant positive correlations between all of the variables. For the older students ($n = 147$) GCSE tariff score is correlated with academic self concept, $r = .346, p < .001$, and mathematics self-concept, $r = .287, p < .001$. Tariff score was negatively correlated with both peer, $r = -.234, p = .004$ and body image self-concepts, $r = -.162, p = .050$. GCSE tariff score was not significantly correlated with general self-concept or English self-concept. These correlations do not change substantially when the effects of age and gender are partialled out. By subject, English grades were positively correlated with academic self-concept, $r = .248, p = .002$, and English self-concept, $r = .364, p < .001$. English was also negatively correlated with peer-self concept, $r = -.274, p = .001$. Mathematics grades were positively correlated with academic self-concept, $r = .402, p < .001$, and mathematics self-concept, $r = .540, p < .001$.

Table 10 shows the correlations between the more personally orientated self-concepts (parental, peer, physical and body image) and the three types of achievement goal. This table shows that a positive parental self-concept seems to be linked with endorsement of learning and performance goals, peer self-concept is associated with all three types of achievement goal, physical self-concept is associated with favouring normative goals and body image self-concept with learning goals. With the exception of the relationship between normative goals and peer relationship self-concept (which becomes non-significant) these correlations remain robust after the effects of gender and age group are controlled.

None of the academic self-concepts were related to theory of intelligence.

However, there were negative correlations between theory of intelligence and peer relationship self-concept, $r = -.111$, $p = .034$, and parental relationship self-concept, $r = -.138$, $p = .008$. This was such that participants with more incremental intelligence beliefs were likely to have stronger relationships with peers and parents. However both effects became weaker when the effects of age and gender were partialled out.

Table 9: Pearson-moment correlations for achievement goals and academic self concepts

	1	2	3	4	5	6	7
1. General SC	-						
2. Normative Goals	.063	-					
3. Learning Goals	.224**	.283**	-				
4. Performance Goals	.205**	.334**	.588**	-			
5. Academic SC	.277**	.261**	.288**	.247**	-		
6. Maths SC	.146**	.224**	.208**	.074	.593**	-	
7. English SC	.234**	.167**	.180**	.216**	.613**	.196**	-

* $p < .05$, ** $p < .01$

N=360

Note: Cases excluded list wise.

Table 10: Pearson-moment correlations among achievement goals and peer, parent, physical and body image self concepts

	1	2	3	4	5	6	7
1. Normative Goals	-						
2. Learning Goals	.278**	-					
3. Performance Goals	.327**	.593**	-				
4. Parental SC	.061	.255**	.256**	-			
5. Peer SC	.117*	.182**	.227**	.326**	-		
6. Physical SC	.132*	.062	.059	.067	.326**	-	
7. Body image SC	.063	.143**	.145	.231**	.557**	.356**	-

* $p < .05$, ** $p < .01$

N= 332

Note: Cases excluded list wise.

Discussion

This discussion section is divided into a number of sub-sections to deal with specific aspects of the findings from this chapter. The first of these sub-sections deals with the incremental bias and the second with demographic trends. The third sub-section discusses the factor analyses while the fourth is perhaps the most substantial as it discusses the findings in relation to Dweck's theories. Section five briefly interprets the self-concept data while sections six and seven handle the study's limitations and draw conclusions respectively. Before beginning there is a brief summary of the findings.

Summary:

- Participants are more likely to hold incremental theories of intelligence than entity beliefs. Participants aged 11-12 are more likely to hold incremental theories than participants aged 16-17. There were no differences with regard to gender or ACORN classification.
- Implicit theory of intelligence (incremental-entity) is positively correlated with overall academic achievement at GCSE. It is negatively correlated with endorsement of learning goals.
- Implicit theory of intelligence (incremental-entity) is negatively correlated with peer and parental relationship self-concepts.
- Performance goals are positively correlated with overall academic achievement at GCSE and performance in the English language GCSE.
- Performance in GCSE maths is positively correlated with implicit theory of intelligence (incremental-entity) and positively correlated with normative achievement goals.

The incremental bias

First of all it is important to state that gifted participants' general preference for an incremental conception of intelligence is in itself of interest. Dweck (2000) suggests that most populations are split fairly evenly between incremental and entity theories and that perhaps the student with higher ability may be more inclined to favour an entity theory because of their lack of familiarity with failure. This does not appear to be the case; in fact the opposite appears to be true. When the data was dichotomized, only 16% of respondents were categorized as holding an entity theory. However, if GCSE attainment is used as an objective measure of ability than it is arguable that there is some support for Dweck's suggestions about higher ability students as higher GCSE achievement was associated with intelligence beliefs that were nearer the entity end of the scale.

The incremental bias evident in this sample may be the result of a number of factors. It could be that gifted students' higher ability allows them to reflect on intelligence in a more complex way than most. This increased awareness of the myriad of variables responsible for intelligence may lead to the conclusion that one single factor (genetics) cannot be solely, or even mostly, responsible.

Alternatively it may be that the participants do not wish to attribute their superior academic abilities to an uncontrollable factor (genetics, nature) because this would strip them of credit for their hard work and tenacity. Unfortunately this is speculation at this stage. Follow-up studies using a comparable 'non-gifted' sample are necessary to explore these hypothetical explanations in greater depth.

Another possible explanation for the incremental bias is that the data is culturally specific to England. Something about being 'English' may be causing the participants to respond in a generally more incremental way. This is plausible though, as far as the author is aware, there are no studies that directly compare the intelligence beliefs of English and American samples. However, there is some evidence to suggest that different cultures have very different conceptions of intelligence. For example, Japanese and Chinese (Sato et al. 2004; Shi, 2004) cultures tend to favour the belief that intelligence is achieved through hard work and diligence (an incremental theory). Further research is needed to establish if there are any differences between English and American culture that could explain an English incremental bias.

A third, perhaps more under-researched, possibility is that those with incremental theories are more likely to respond to surveys. It seems possible that if an individual believes that their intelligence can be improved through learning than they may be more likely to engage with an exercise such as a survey that may provide a learning experience. The survey did require thought and reflection on the part of the respondent and so the incremental theorists may have viewed it as an opportunity to acquire more knowledge.

One final possibility is that the incremental bias directly reflects an issue with the instrument itself that was raised by Dweck, Chiu & Hong (1995). They suggest that only the three entity items should be used and the three incremental items excluded on the grounds that incremental statements are disproportionately compelling (p.41). However, this does not seem likely given that there were not

statistically significant differences in the results generated by the six item and three item versions of the measure (p.145). Overall, these reasons are all plausible and it may be that the incremental bias is a result of one or all of them.

Demographic differences

The lack of any gender differences was surprising. Licht & Dweck (1984) found that girls in the eighth grade (13-14 years old) were significantly more likely than boys to hold entity theories. They suggest that girls are also more vulnerable to the 'helpless' response to failure and more likely to avoid engaging with tasks which they do not feel they will be good at. These tendencies have been demonstrated with high ability girls (Licht & Shapiro, 1982; Licht et al., 1984) and so it seemed reasonable to expect them to emerge here. There is no immediately obvious explanation for why this study does not replicate the previous findings but a cultural explanation seems most likely. Perhaps girls in England are treated differently in a certain relevant way to those in America. At this stage any possible explanations as to how would be pure speculation, but it appears as if there is no significant association with gender when gifted and talented students in England define their intelligence beliefs.

Although gender differences did not emerge, there was a tendency for older students to be more likely to hold an entity theory than younger students, which echoes the research of Dweck (2000) and Ablard & Mills (1996). This seems to suggest that as students move through the school system, encountering more regular and stringent evaluation of their academic performance as they go, they shift away from the view that their intelligence is malleable and more towards the

belief that it is fairly stable. Perhaps the more they study at school and maintain a certain level of achievement, the more they believe that this level is stable and specific to their own innate abilities.

For example, it is possible that because these students are consistently performing at a high level and, in many cases, are able to ‘cruise’ through tests that are not challenging enough for them, they start to believe that their success is a result of their own innate ability. Caution is required to temper this interpretation as the present study is not longitudinal. Further research would be necessary to shed more light on any developmental theory, following students through their school years and exploring how their beliefs change with their experience.

Factor analysis

Factor analysis was used to reduce the number of variables measured by the achievement goal instrument and this warrants further discussion. When Grant & Dweck (2003) completed a factor analysis of the measure using their data they suggested that learning and challenge-mastery goals could be collapsed in to a single factor as could normative outcome and normative ability goals. This finding was replicated. However their findings differ to those in this thesis in that outcome and ability goals remained distinct. In the current study the ability and outcome items loaded on to a single factor which was labeled ‘performance goals’, merging the concepts of aiming to achieve positive educational outcomes and wanting to demonstrate the ability to achieve those outcomes.

There are several possible explanations for this difference. Firstly, there may be cultural differences between England and America in how ability and outcome are perceived. In England there may be less of a distinction between ability and outcome. Perhaps outcomes are considered to be inherently tied to 'ability' rather than situational factors, meaning that these two concepts are encapsulated in the same goal. For example, perhaps English students do not consider it possible to gain a good grade in a subject without displaying high ability in that subject, while American students believe good grades can be gained without displaying high ability (perhaps other factors are deemed more important) while high ability can be demonstrated without the individual necessarily gaining a good grade.

An alternative explanation may be that the difference reflects the gifted nature of the sample. Ability setting and special provision mean that personal high ability is often very salient for the gifted and talented throughout their school experience. Perhaps as a result of this the goal of demonstrating ability is tied to achieving good academic outcomes in a way that it is not for other students. For example, if a student has high expectations with regard to academic achievement because they have been labeled as 'highly able', ability and outcome may become more closely aligned. On the other hand a student in a lower set who does not expect top grades may have a tendency to prioritize demonstrating ability in ways that are not as closely associated with typical outcome measures. For example, they may not achieve good grades but they may display ability, perhaps hinting at potential or non-academic skills related to the subject. Further research would be necessary to explore these two possible explanations.

Finally the factor analysis for the six theory of intelligence items suggested that the measure was indeed examining a single concept. This finding supports the notion that theory of intelligence is a single factor that ranges between incremental beliefs at one end of the scale and entity beliefs at the other. The finding also offers some support for the decision to use all six items of Dweck's (2000) measure rather than just the three entity items. If entity and incremental theories were separate concepts rather than separate ends of the continuum then two factors would be expected to emerge rather than just one.

Dweck's model

Implicit theory of intelligence was correlated with a learning goal preference score, which is in line with Dweck's (2000) theory. An incremental belief suggests that intelligence can be manipulated by learning and overcoming challenges while an entity theory suggests that intelligence cannot be manipulated in this way. Entity theorists are therefore less interested in targeting learning as an objective because they believe there is less to gain and instead they target high achievement as a means of demonstrating high ability. However, there was no strong correlational evidence to suggest that intelligence beliefs were linked to performance goals.

Dividing the participants up into groups according to whether they rated performance goals more highly than learning goals or vice versa (p.147) did suggest that those with performance goal preferences demonstrated intelligence beliefs which were closer to the entity end of the continuum than those with a preference for learning goals. However this approach was limited as it did not

distinguish between those with very small differences between their performance and learning goal scores and those with large differences. In general the sample rated both goal types as being highly important to them. These findings seem to reflect a generally positive endorsement of all academic goals by the gifted and talented sample. Evidence from Senko & Miles (2008) suggests that those with learning goals can underachieve due to a focus on material they consider interesting at the expense of studying material relevant to academic assessment. Perhaps the endorsement of both learning and performance goals exhibited by this gifted and talented sample is an important component of their success – they do not suffer the negative consequences of focussing more on one type of achievement goal over another and by striving both to learn and to perform well in assessments they are taking the most adaptive approach.

Also counter intuitive based on Dweck's model was the finding that students who were more orientated towards an entity theory had superior GCSE achievement. The fact that only the older students could provide GCSE grades may have had some impact here. The incremental bias was less pronounced for the older age group with 53% of the students in the incremental category and 22% in the entity category, and the older students had significantly higher scores on the theory of intelligence measure. It should also be noted that the correlation was weak, with theory of intelligence accounting for less than 3% of the variance in GCSE score.

Despite this limitation it is interesting that this gifted sample seemed to benefit from an entity theory. This is incongruent with the hypothesis that entity theories can lead to underachievement and may again be due to the nature of the sample.

Perhaps those gifted students who are performing even better than most of the top 5% are the ‘best of the best’ and as a result their academic prowess is so salient that it becomes engrained in their identity. If a student considers their academic ability or intelligence as a core part of their individuality perhaps they also view it as more stable and unchangeable. Personality traits such as the so called ‘Big five’ of Agreeableness, Conscientiousness, Emotional stability, Extraversion and Openness (see Goldberg, 1990) have been shown to be a central part of people’s self-image (Lounsbury et al., 2007), and perhaps intelligence can also become integral when it is highly emphasised. Being identified as ‘gifted and talented’ may contribute to intelligence becoming a central element of identity.

Alternatively perhaps the incremental theorists who are performing at a lower level than the rest of the sample explain this finding, as the scatter plot (**Figure 10**) seems to suggest. It is possible that the lower scoring students find themselves included in this gifted and talented sample by virtue of their hard work rather than their natural flair, while those achieving the highest grades are rarely stretched by challenging work. For example, perhaps the very best students can achieve the top marks without hard work or without adapting to new strategies to overcome setbacks. To them, within the limited and capped context of the exams they take, the fact that they consistently achieve the best possible grade without feeling particularly challenged suggests that their ability comes naturally. It is fixed and innate. However the student who has room to improve, the student who gets B’s and C’s, may have had a different experience. If this student shows consistent improvement through applied effort they may associate improving grades with

their hard work and their study strategies and so be more likely to adopt an incremental belief as a result of this experience.

One possibility that was partially explored was that the model may apply to achievement in specific subjects better than in others. English and mathematics GCSE grades were examined as an outcome measure to see if they had different relationships with the variables of the model. As with overall GCSE achievement, Dweck's model did not apply when accounting only for performance in these subjects and, also as before, stronger entity theories were related to better grades (though this relationship was weaker for English than for mathematics). The relationship between theory of intelligence and learning goals remained.

More surprising was that for both achievement in mathematics and English there was a correlation between achievement and one of the achievement goals that was not apparent when examining overall GCSE achievement. Higher mathematics grades were linked with stronger normative goals which suggested that the students may somehow improve through competitive behaviour within the subject. This may be the result of the precise and generally objective way in which mathematics is graded as it is essentially based on 'correct' or 'incorrect' answers. There was no such relationship between English grades and normative goals but there was a positive relationship with performance goals. This suggests that the drive to get a good grade is more positively related to success in English than in mathematics and that personal achievement is more important than competition. For both subjects the specific goal of learning is unrelated to the outcome of getting a good grade. It seems more important for the participants to

want to achieve good grades, whether as a personal standard or to outperform peers than for them to target learning new facts and skills. These entity related drives are related to better performance which again suggests that Dweck's model does not apply to gifted and talented students.

Overall, the results of this study do not seem to support Dweck's framework. This is not to suggest that the theory is invalid but rather that it does not appear to apply to gifted and talented students in the same way as it applies to other people. The findings are very similar to those of Ziegler, Heller & Stachl (1998) who found that highly gifted students in Germany were more likely to hold incremental beliefs about intelligence than entity theories, yet were still likely to endorse performance goals. Their goal was not just to learn but also to perform. There seems to be some convergence on the idea that the gifted population are an exception to Dweck's theory and this is a key finding of this thesis – the high achievement motivation of this group in multiple domains may set them apart as a unique population. Exploring why the model does not wholly apply to them and how gifted students conceptualize intelligence and apply this belief are the objectives of subsequent chapters.

The role of self-concept

This study also took measures of self-concept in an attempt to try to explore possible relationships with both theories of intelligence and achievement goals. Nearly all of the self-concept measures were positively correlated with one another and with the measures of achievement goals - positive self-concept in multiple domains appeared related to greater endorsement of both learning and

performance achievement goals. This may reflect greater self-belief in the more positive participants leading to more ambitious goals. However, it may be the result of the high self-concept ratings that were given by the students. This generally positive response is reflected in the correlations and with the exceptions of peer, parent, physical and body self-concepts the data showed such strong negative skew that there was too little variance for meaningful analysis.

The characteristics of the data meant that it was more meaningful to explore the relationships where there was no statistically significant correlation. Performance goals were not correlated with either body self-concept or physical self-concept. Physical self-concept was also unrelated to learning goals and normative goals were unrelated to parental self-concept and body image. There are no immediately obvious explanations as to why these relationships did not emerge while the others did. It is likely that the trends simply reflect generally positive feelings towards both goals and the self, with the exceptions reflecting the fact that body image and physical self-concept are generally unrelated to academic performance.

Theory of intelligence was negatively correlated with both peer and parental relationship self-concepts suggesting that individuals with stronger entity theories were less satisfied with their personal relationships. This may reflect entity theorists' beliefs that personal attributes are fixed and stable in that it may make them unforgiving. For example, perhaps a negative encounter with a friend or family member is considered more damaging to the relationship as it is considered to represent a fundamental clash of personalities. Alternatively incremental theorists may be more forgiving as they may take into account the role of the

situation in such negative encounters. This is conjecture but it would be useful to ascertain whether entity theorists extended their view on the fixed nature of intelligence to other attributes and whether this affected their relationships. Overall self-concept, as measured in this thesis, does not seem to have clear relationships with Dweck's model but this does not rule out self-concept as playing an important role in motivation.

Limitations & issues

This survey study has a number of limitations. Some of these issues are inherent in research of this type, some come from the practical limitations of carrying out a research at the PhD level, and a few could have been dealt with more effectively with the benefit of hindsight. This section will discuss the general administration of the survey and the response along with the limitations of the methodology and the resultant findings.

There were some issues with the response rate as there seemed to be evidence of a response bias, with females being more likely to respond than males and the younger students more likely to respond than the older ones. These discrepancies are difficult to explain, though one possible theory is that the older age group may not have had as much free time in which to complete the survey due to heavier demands from their courses and from other activities such as part-time employment. The implications of this sample imbalance are unclear but, given that gender effects were controlled where possible and much of the analysis of Dweck's model used only the older students, the impact is unlikely to be too negative. The sample was stratified for age and gender but perhaps with greater

time and resources extra surveys could have been sent out to males and older students in an effort to balance the sample. Statistical weightings could also have been used but given the effects of both age and gender were controlled in much of the analysis this was deemed unnecessary.

Another issue related to sample and response comes from the observation that so many of the participants seemed to respond very positively to most of the items in the measures. The lack of variation in the response is unlikely to be false, the respondents probably did feel very positive, but the tendency for positive response may reflect the fact that the survey was voluntary. It seems probable that those with the necessary enthusiasm to complete an extra piece of paperwork for no tangible reward are also going to be those who are more motivated and likely to be more driven by the achievement goals that were measured. Unfortunately such issues are difficult to counteract and there is no firm evidence for their existence. Short of forcing the entire sample to participate it cannot be rectified and is a problem inherent in research of this type.

Perhaps the most significant issue with this study is the lack of a non-gifted comparison group. A suitably representative, national comparison group of students was not available for this project and as a result it is difficult to draw strong conclusions with regard to how the beliefs of gifted and talented students differ from those of other students in the same age range. The finding that gifted students seem to have a tendency to hold more incremental beliefs is descriptive because it remains unknown whether this is an unusual finding within the context. Creating a matched sample of non-gifted students would allow for a successful

comparison but this would require substantial resources and would generate a host of practical and theoretical issues. For example, the NAGTY sample is national and gaining access to a national sample is very difficult. Communicating with a significant number of geographically dispersed individuals and gaining the necessary large-scale financial backing would be extremely hard at PhD level. Also, defining 'non-gifted' would be problematic. It would be difficult to reasonably decide which students qualified when trying to represent such a diverse range of abilities and backgrounds and the option of creating a sample composed of students that were defined as 'non-gifted' on the grounds that they were not NAGTY members would be overly simplistic.

Another problem was the substantial ceiling effect and the restriction in range of scores for the GCSE achievement measure. When a sample has a restricted range of scores the strength of correlations is reduced, sometimes dramatically, and this sample deals with GCSE scores that lean strongly towards the upper end of the scale. This does not contradict the weak relationships that have been identified in this research but it means that Dweck's model may not work in this sample due to the highly restricted range of possible values. The model may fit data from the general population, where such variability issues are not so pertinent. A more nuanced way of gauging achievement may have eradicated this effect and allowed more subtle differences in achievement to have been analysed. For example it would have been beneficial to have access to the students' raw exam scores (perhaps as a percentage) rather than just their grades. There may be significant differences between a student that achieves a perfect score to achieve an A* and a

student who receives the same grade but acquires the necessary score by a single percentage point.

Gaining access to raw scores may have also been useful when exploring the key stage 2 SAT scores which were rendered unusable by strong ceiling effects. This would have potentially allowed achievement to have been explored as a variable for both the younger and older student age groups. There are substantial practical issues involved in obtaining this data, which is why self-reported levels were decided upon for the measure. It was decided that 'levels' would be easier for the participants to recall than raw scores but perhaps this was an inaccurate assumption. It may have been worth testing the idea that raw scores could be successfully recalled during the pilot. Overall restriction of range and ceiling effects are problems inherent in research exploring the academic achievement of the gifted and talented.

With regard to the theory of intelligence measure, there was a technical issue with the decision to use all six items of Dweck's (2000) instrument rather than just three (**see p.145**). The approach used to counter this issue was not without flaws. The order of the questions may have had an effect because in all cases participants saw the entity items before the incremental items and this may have primed certain responses. A second flaw is that the approach makes a questionable assumption: that the participants completed the items in order without reading ahead. This assumption is unlikely to hold true for all participants. Conclusions drawn from this comparison have to remain tentative and the possibility that the

use of all six items biased the participants towards an incremental theory should be acknowledged.

The strengths and weaknesses of selecting Grant & Dweck's (2003) measure of achievement goals over others were discussed in **chapter III (p.111)** but it is worth briefly revisiting. It would have perhaps been beneficial for this study to also incorporate measures of approach and avoidance goals (e.g. Elliot & Church, 1997) in an attempt to gain a more nuanced understanding of 'performance' goals. Avoidance goals can lead to underachievement through disengagement but perhaps gifted and talented students rarely hold performance goals which are not of the more pro-active 'approach' variety. A gifted and talented student with an entity theory may well endorse performance goals, as Dweck (2000) would predict, but perhaps their high ability has given them such confidence that they will achieve a positive outcome that it is almost always an 'approach' performance goal which they endorse. It would have been useful to integrate this distinction into the measure and would be a key consideration for future studies.

Conclusions

Overall the data gathered in the survey seems to suggest that Dweck's model does not apply to gifted and talented students in the same way as it does to other groups. Strength of performance goal endorsement is related to actual performance but holding this goal does not appear to be significantly related to theory of intelligence. There is also a relationship between incremental intelligence beliefs and strength of learning goals but this does not seem to facilitate improved achievement in this high achieving group. As discussed earlier

in this section, there are a number of possible explanations regarding why Dweck's model may not be suited to gifted and talented students. The next three chapters will employ various methods to quantitatively and qualitatively explore these explanations, using student voice to examine why the model may not be best suited to this particular group.

Chapter V: Comparing Dweck's measure of theory of intelligence to participants' qualitative explanations

This chapter analyses the qualitative data generated by the three open questions in the questionnaire (see **appendix A**). As part of this process it deals with a question that was raised by the findings discussed in the previous chapter: why is it that Dweck's model does not seem to apply to gifted and talented students? The open question about theory of intelligence may shed some light on this, perhaps allowing the identification of differences between the reasoning of the sample and the reasoning expected by the model. There is also analysis of data from the other two qualitative questions, both about motivation in the school context.

There are four main sections to this chapter. The first section explores the validity of the theory of intelligence measure by directly comparing the qualitative descriptions of intelligence given by students with their score on Dweck's measure. The second section takes this a step further by thematically analysing these qualitative descriptions to explore how they compare to the entity-incremental explanations that underpin the model. The third section explores some of the comments participants made about motivation in general to examine the relative importance of theories of intelligence within the broader framework of motivation. This analysis also seeks any variables that are unmeasured by the model but appear to be of importance. Finally these findings are critically discussed with reference to their implications and impact on the thesis as a whole.

Testing the validity of Dweck's theory of intelligence measure: Does it reflect participants' explicit beliefs about intelligence?

The findings of the previous chapter suggest that Dweck's model does not adequately apply to gifted and talented students. There are two possible reasons for this. Firstly it may be that the theoretical model was not supported for technical reasons resulting from the unreliable or invalid measurement of the concepts. This possibility has been discussed previously in **chapter IV**. The second reason is that the model did not statistically apply to the students because the theories underpinning it did not apply. It may simply be the case that the beliefs about intelligence held by gifted and talented students cannot be divided into incremental or entity categories, or that their intelligence beliefs are largely unrelated to their achievement goals because of mediating or moderating factors that do not influence other populations. This section explores this possibility by examining how the students freely describe the nature and origin of intelligence.

Method & procedure

In **chapter IV** the quantitative score produced by Dweck's (2000) measure was used to divide participants into 'incremental', 'entity' or 'neither' categories (see **p.145**). This categorization was compared with the responses to the open question '*Please write a few sentences about what you understand by the term 'intelligence' and where you think intelligence comes from*' for each participant. Each response was analysed such that responses that suggest entity, incremental or neither/both theory were coded as such. The researcher carefully read through each response and completed the coding for each individual participant, inputting the code into SPSS as a separate variable. Participants that did not complete all six

items of the theory of intelligence measure were excluded from the analysis, as were participants which did not answer the open question or offered incomplete answers. Answers judged to be irrelevant to the question were also excluded. The process of coding is integral to drawing valid and reliable conclusions and strict criteria were applied. These criteria are displayed in **table 11**.

It is worth providing a typical example for each coding category. The answer:

‘Being clever, understanding things quickly. You are born with it, possibly passed down genetically from your parents’ was coded as entity, while the answer: *‘I think you can be intelligent by working your best, so I think if someone says your intelligent then that means that you’ve worked really hard’* was coded as

incremental. These are fairly clear examples but others were more ambiguous and required closer inspection. The neither/both category was the most complicated to code as in some ways it was a ‘catch all’ that included answers of two types.

Firstly there were answers that appeared to mix both incremental and entity theories (e.g. *‘Intelligence is the ability to complete tasks and how you approach them. It comes from parental genes and a good education’*). Secondly there were those that were relevant but ambiguous (e.g. *‘Intelligence is the capacity to understand and question things. I do not believe there is any way to measure intelligence as people can demonstrate it in many different ways’*). The different types of response are explored in greater depth in the next section.

Table 11: Criteria for coding answers to the open question ‘Please write a few sentences about what you understand by the term ‘intelligence’ and where you think intelligence comes from.’

CODE		
Incremental	Entity	Neither/Both
Reference to intelligence coming entirely through experience	Reference to intelligence coming entirely from genetic factors or ‘from the brain’	Ambiguous answers that refer to intelligence but in an unclear manner
Reference to intelligence being learnt and coming from hard work	Reference to intelligence being natural or gifted	Answers clearly containing both incremental and entity statements
Reference to the improvement (or decline) of intelligence over time	Reference to intelligence being a fixed, unchangeable or stable attribute	Answers that suggest intelligence is learnt and natural in fairly equal parts
Reference to the importance of environmental factors for developing intelligence	Reference to the environment making little or no difference to overall intelligence	Answers that clearly contradict both entity and incremental theories
Reference to learning being far more important to intelligence than natural and/or predetermined factors	Reference to natural and/or predetermined factors being far more important to intelligence than learning	Answers that provided clear theories of intelligence that are not related to the entity-incremental continuum
Reference to learning or developing intelligence at a young age through interaction with parents/peers	Reference to knowledge being learnt but intelligence being natural or predetermined	

The coding criteria were used to structure and standardize the subjective decisions of the researcher as far as possible. Once the coding was complete it was possible to statistically compare the response to the open question with the categorization of the score from Dweck's measure within participants. It was also possible to detect the pattern of differences between the categorization of the measure and the coding of the open question for each participant.

Results

A total of 348 participants produced valid data for this analysis. The gifted and talented students of the sample were most likely to hold 'neither/both' theory of intelligence (49%). Of the remainder 38% were categorized as holding an incremental theory and 14% as holding an entity theory. This is significantly different to the categorizations generated by the scores from Dweck's measure, $z = -7.84, p < .001, r = -.42$ (Wilcoxon signed-rank test), in which most participants were categorized as incremental (64%), with 20% categorized as neither and 16% as entity. The effect size of this difference was medium (Field, 2005).

An analysis of how the qualitative and quantitative categorizations differed was carried out. In the majority of cases the two categorizations did not differ (51%), but a substantial proportion did show change. An incremental categorization on the quantitative measure but a neither/both categorization for the qualitative categorization was the most common difference (30%). It was less common for participants categorized as neither on the quantitative measure to be categorized as incremental or entity on the qualitative measure (8%). It was even less common for entity categorizations on the quantitative measure to be matched with a

neither/both categorization on the qualitative measure (6%) and for an entity categorization on one measure to be incremental on another (5%).

To test whether the stability of categorization across measures was affected by age or gender, chi-square tests were carried out. The younger (11-12 year old) students were no more likely than the older (16-17 year old) students to show a discrepancy between their categorizations across measures. The same was true with gender, with males and females being equally likely to show a discrepancy in theory of intelligence between measures. Overall there was a tendency for the qualitative response to demonstrate less precision than Dweck's measure when categorizing participants' theories of intelligence which resulted in a greater proportion of neither/both categorizations to occur.

Participants' explicit theories of intelligence

The answers to the open question about intelligence provide nuanced insights into how participants describe their own beliefs about intelligence. In order to understand why coding these answers produced substantially different categorizations than those based on the score from Dweck's measure it is important to analyse their content. This section explores the answers thematically, examining their content and identifying why they tend to express ideas which defy entity or incremental categorization. The analysis was focussed on the participants' theories of intelligence rather than their views on the structure of intelligence (although the two were sometimes explicitly connected) with the main objective being to generate ideas for follow-up in future studies. This analysis did not aim to provide conclusive answers about the theories of intelligence of gifted and talented students but rather to generate ideas for exploration in subsequent studies.

Method & procedure

All of the answers to the question '*Please write a few sentences about what you understand by the term 'intelligence' and where you think intelligence comes from*' were read from the questionnaire in their hand-written form and typed into a word document, with each entry marked with an identity number. This process was as faithful as possible to the original text and included symbols such as 'smilies' (combinations of punctuation marks arranged to represent facial expressions). Where hand writing was illegible, sentences were marked *<illegible>* and no attempt was made to fill in these blanks or to alter the original form of the text (spelling and grammatical errors were not corrected).

Once this transcription document was complete it was read several times and excerpts that struck the researcher as relevant and important were highlighted. These highlighted excerpts were then read through again and labelled with a theme that seemed relevant, with the excerpts being grouped according to these emerging themes. The themes were carefully considered and were required to be distinct and fairly broad. If they were too specific they would encompass only a small number of comments which would make thematic analysis at this level very difficult. This process resulted in several similar themes being combined so that the main ideas emerging from the text could be explored in greater depth. Once these broad themes were established the entire document was re-read several times and coded according to these overarching themes.

Results

Five main themes emerged from analysis of the comments about intelligence, and these are discussed and illustrated by examples. There was considerable variety in the complexity and articulation of response, though this mainly centred on the age difference within the stratified sample, with the older students tending to produce the richer material. Where quotations are used the age and gender of the participant who supplied the data is indicated in parenthesis. These quotations are selected to represent each theme on the basis of how clearly they articulate typical trends that permeated the data. Great care was taken to avoid the selection of quotations that were not representative of the data, for example statements that were particularly well-written or engaging but expressed a point of view that was not thematically common.

Incremental intelligence beliefs

Many of the answers expressed incremental theories, suggesting that intelligence was entirely about learning, the environment, application of effort, or a combination of all of these. Most of these were fairly unambiguously incremental, stressing the role of effort and the expansive nature of intelligence:

When I think of the word intelligence I always think of a never ending journey. Every day you become more and more intelligent. ...I think that the harder you strive for your achievements and goals the more intelligent you may become. (Female, 11/12 years old)

Other participants expressed the notion that intelligence could be lost or wasted through lack of effort, an idea that is also incremental:

Intelligence is like a pot with water in. You keep adding into it. People who don't want to learn just tip the water out... (Male, 11/12, years old).

The above quotations are fairly clear cut examples of incremental theories but several of the answers were more ponderous. The example below acknowledges the role of learning beyond organized education and also the importance of the individual being motivated to engage with learning opportunities:

To me, intelligence is the knowledge that you have, and people must become 'intelligent' by learning. Not just in classes at school but also by taking an interest in the world around us. You do not inherit intelligence from parents in my opinion, although you may be brought up to have a wide range of knowledge. I suppose 'intelligence' comes from your upbringing and a natural thirst for learning. (Female, 16/17 years old)

This example explicitly undermines entity theories by dismissing the notion that intelligence is inherited. The participant is keen to state that genetic explanations for intelligence are in direct opposition to her own explanations. Also interesting in this example is the statement about intelligence essentially being the same as knowledge. It is unclear whether this point of view is common among all incremental theorists.

Entity intelligence beliefs

Several participants expressed views that were entity based. These participants focussed on the role of genetic inheritance and the fixed, innate qualities of intelligence. Some of the answers were concise and clearly entity in nature:

You are born with it, possibly passed down genetically from your parents.

(Female, 11/12 years old)

This type of answer was devoid of context but clearly suggested a belief that intelligence was an inflexible and predetermined individual attribute.

In contrast to some of the incremental answers, a few of the entity responses displayed a tendency to separate the concepts of intelligence and knowledge.

Something you are born with – it is not something that can be greatly improved – whereas general knowledge can. Intelligence is your ability to understand topics and tackle them effectively. (Female, 16/17 years old)

This participant seems to be suggesting that intelligence is the foundation to knowledge, or rather a stable attribute that mediates how effectively knowledge can be obtained. It could be argued that this individual has an entity theory of

intelligence but an incremental theory of knowledge – intelligence does not change or develop but knowledge is something that can be gained and lost.

This feeds into the notion expressed by some of the entity theorists that intelligence dictates a person's potential for academic achievement but that the person still chooses whether they fulfil or squander this potential:

Intelligence is how much of an ability you have to learn. I think intelligence comes from your genetic make-up (i.e. your born with it) but it's up to the person whether they realise their potential. (Male, 16/17 years old)

It is arguable that this is not an entity theory, at least not in the purest sense.

According to Dweck's model an entity theorist becomes incapacitated by failure at a task because they believe it has been beyond their level of ability. Some of the entity theorists in this study seem to suggest that effort plays an important role in intelligence because it can facilitate the fulfilment of potential. This idea is discussed further in the next section.

Intelligence is a mix of innate and environmental factors

A very common answer involved participants combining elements of both entity and incremental theories. Such beliefs encompassed the roles of effort, learning, and the environment along with genetic factors while suggesting that intelligence is changeable and flexible but only within certain predetermined parameters. The below are examples of the expressions of this belief:

I think intelligence comes in two parts. 1) It's something in your genes you inherit from your parents, 2) if you study a lot or want to be bright and work hard. (Female, 11/12 years old)

...Everybody has the potential to be intelligent, but it is developed by the outside world. A genius is born obsessive and curious.

(Female, 16/17 years old)

Intelligence, I feel, is a combination of how clever or bright you are naturally, and how hard you want to improve. Even the brightest people can let their faculties go to waste if they do not make an effort, and the less clever, if they work hard, can easily overtake them. (Female, 16/17 years old)

These participants believe both genetic and learnt elements are important for intelligence. The first quotation simply states that both incremental and entity elements are important to overall intelligence without expressing how these elements may interact, which was a relatively common response. The second quotation seems to suggest that high intelligence requires a naturally curious and obsessive nature, which indicates that predetermined personality traits may be important for learning. This suggests that, while intelligence is developed through learning, only certain personality types can be highly intelligent. This type of response was rare. The third of these quotations suggests that effort is more influential than initial levels of intelligence because it states that hard work can allow someone with less natural ability to surpass those with more. Arguably this participant lies nearer the incremental end of the spectrum, while still holding a theory of intelligence that combines incremental and entity elements. There appears to be substantial variation in how these mixed theories blend incremental and entity elements.

In contrast to the example above, the next quotation seems to portray a mixed view that is nearer the entity end of the continuum:

I believe that everyone has natural boundaries so some will hit a ceiling at lower levels than others, but you can only reach your intellectual potential if you are happy, taught well, looked after properly, etc. So intelligence comes partly from your genes and partly from what people around you have put into helping your intelligence develop. (Female, 16/17 years old)

This participant suggests that natural boundaries to intelligence exist and that these are genetically determined. This is an entity type belief as it states that an individual's intelligence level is capped. However, the virtues of being taught well and looked after properly are also extolled as is the notion of intelligence developing. The participant is suggesting that intellectual potential rather than intelligence itself is predetermined and as such their beliefs cannot be categorized as entity. This echoed the answers given by some of the entity theorists who suggested intelligence was predetermined but effort was required for an individual to achieve their full potential. One participant neatly illustrated this type of mixed belief with an analogy:

I think intelligence could be represented as a muscle because you are born with a certain amount of muscle and you can exercise this muscle and it will expand or you can leave it and do nothing about improving it and it will always be there. (Female, 11/12 years old)

Most of the answers were rather general in nature, as would perhaps be expected from a single open question, but a few provide a context from which to understand mixed beliefs:

... school up to GCSEs was fairly easy and I could get by without doing much work, but now, especially for A level, you need to work hard and want to learn to become clever and get good grades, when previously you could get by on your natural intelligence. (Female, 16/17 years old)

This participant provides an example in which their natural ability alone was no longer substantial and they needed to stretch their intelligence through diligent hard work. Again, the idea that natural intelligence is something that has to be actively exercised arises, a notion that combines the idea of intelligence as predetermined with the idea that it is flexible. The participant below encapsulated the idea of naturally occurring intelligence as something that needs to be utilized rather than something that unconsciously facilitates high ability, describing it as:

...a tool to be used, and I believe a lack of it can be made up with determined hard work, and I think this applies to everyone. (M, 16/17, neither/both)

The description of intelligence as a 'tool' illustrates an important recurring dimension to these mixed theories of intelligence.

Intelligence level is established in childhood

One point of view that was raised by several participants was that early childhood experiences are integral to the development of intelligence:

People become intelligent from their parents attitude and how they are brought up in their early 3 years. Intelligence levels are passed on from parents, but this does not contribute much if not followed up by a good upbringing.

(Male, 11/12 years old)

This participant suggests that genetic predispositions to intelligence can be only be realised through a stimulating upbringing. The participant seems to be

implying that there is a crucial period of development which means that later environmental stimulation is relatively ineffective. This idea is combining incremental and entity elements by stating that intelligence is developed but that this development is much less effective after an individual's formative years.

Some participants had quite complex ideas about how intelligence develops in these early childhood years:

... Intelligence is a measure of logic, reasoning and memory. Although some children display more intelligence early on, either because of inherent ability or early experience and adaptation, thinking skills and logic can be improved in the same way memory can, first artificially through systems of thought which subsequently become embedded in the subconscious to an extent that makes it indistinguishable from 'natural' or inherent intelligence. It is much easier for a child to learn these skills... (Male, 16/17 years old)

This participant suggests that 'natural' intelligence is not only the result of genetic predispositions but also systems of thought that are learnt very early in life and become the basis for intelligence. He makes a point about how this type of early learning can be misidentified as natural ability. This point of view could be conceived of as an entity theory as it suggests that intelligence cannot be improved in later life but, as with some of the mixed theories, it clearly incorporates incremental ideas. Theories of this complexity were rarely expressed but this example serves to demonstrate how deeply it is possible to theorize.

Intelligence is multi-faceted

A regularly expressed point of view was that thinking about intelligence as a single attribute was inaccurate or an over-simplification. Many of these participants suggested that it was more sensible to divide intelligence into different types that applied to different situations:

Intelligence is subjective. It can take different forms. You do not have to be good academically to be intelligent, people can be emotionally intelligent, as well as many other types. (Female, 16/17 years old)

The idea that intelligence is subjective suggests that it is defined differently by different groups and individuals and is a social construction. This participant also suggests that intelligence should be broken up into different parts and uses emotional intelligence as an example of this. This multi-faceted point of view does not invalidate incremental or entity beliefs. It may be logical to believe that there are different types of intelligence and also that each of these types is either adaptable or predetermined.

Participants' comments on motivation

In addition to the open question about intelligence, the questionnaire included two open questions about factors that were motivating and factors that were de-motivating at school. These questions were designed to allow the participants to openly discuss motivation and to explicitly raise the issues they felt were most important in the school context. There were two main aims of these questions: a) to ascertain when and how theories of intelligence related to day to day motivation, if indeed they ever consciously did, b) to find out more about the intrinsic and extrinsic factors that influence motivation in order to speculate about how they may be related to theories of intelligence. The analysis of these questions is highly explorative as this part of the questionnaire was designed to maintain a broad perspective for generating ideas for future study.

The data was handled in a similar way to that from the open question on intelligence. As before, all of the answers to the questions '*Please write a few sentences about the type of things that motivate you to work hard at school*' and '*Please write a few sentences about the type of things that put you off working hard at school*' were accurately copied into a word document from the questionnaire and marked with an identity number. The answers to the two questions were paired together for each individual and analysed as a single piece of data. The transcript was read through several times with excerpts being highlighted and labelled with a logical theme as it occurred to the researcher. Again, the themes were developed over several iterations and kept distinct and relatively broad, given that the aims of the analysis revolved around idea generation rather than complex interpretation. Once the themes were substantially

prepared the transcript of answers was read through several more times and the remaining data was coded.

Results

As with the question about intelligence, the open questions about motivation provided a variety of answers of different levels of complexity. On the whole participants were likely to list important factors; often encompassing multiple themes, and occasionally they made connections between these factors and themes. Ten themes emerged from the analysis. Each of these will be briefly discussed and illustrated with quotations. Once again these quotations were selected for how well they represent the theme and an attempt to avoid irrelevant quotations was made, regardless of how articulate or attractive a quotation was. It is important to note that although the quantity of comments on a particular theme is alluded to, these quantities were not measured. This would have been beyond the remit of the questionnaire - the aim of this section is to generate ideas rather than to generalize these themes.

Quality of teaching

Many of the participants suggested that the quality of the teaching they experienced had a substantial impact on their motivation. Good teaching was praised as being highly engaging while participants stated that certain teachers had a boring style of delivery which reduced their motivation to engage with the subject. Though most of these statements were very short and clear, using brief statements such as 'bad teachers' and 'good teaching', a few were more elaborate:

I get put off when teachers try to teach you something but don't explain it to you in full detail and then set you work when you don't understand it. Another aspect that puts me off is when we don't understand something in a particular topic and the teacher just moves the class onto a different topic before making sure that everyone has a full understanding of the previous one... (Female, 11/12 years old)

Boring teachers – I have a small concentration span so I enjoy lessons with lively, exciting teaching methods. (Female, 16/17 years old)

...I think I'm always well motivated to do well although I found that this year in Biology I was particularly motivated to do the best I could as I had a very dedicated and hard working teacher who put in a lot of effort to help the class, and I did not want to let her down.

(Female, 16/17 years old)

These examples examine two separate elements of teaching quality. The first two seems to refer directly to the transfer of information from teacher to student. Participants made both positive and negative comments about how capable teachers were at meeting the needs of their class and successfully conveying information and the extent to which the teacher sustained interest and engagement was a common element of this theme. The second quotation refers to slightly more personal evaluations of the quality of teaching which take into account how dedicated or personable the teacher is. This was common for both positive and negative statements on motivation.

A few students also referred directly to teaching resources suggesting that learning environment, access to information technology and access to other types of resources could have positive or negative effects on motivation:

My mind goes off my work, as our classrooms are small, and usually cramped, so there is not enough working space to concentrate – sometimes. (Female, 11/12 years old)

Though these comments were relatively rare and did not refer to teachers directly, they reflected the importance of viewing teaching quality as highly dependent on the quality of the teaching environment and the available resources.

Engagement with material

Participants reported that the level to which they felt interested by the learning materials or the subjects themselves had a substantial bearing on their levels of motivation. Boring or repetitive work was regularly mentioned as de-motivating, while work which was made accessible or relevant to the student or work that sparked a personal interest was considered motivating. The participant below expresses the importance of such personal interest:

I am motivated purely by interest and passion for a particular subject and I always strive to learn and understand new things. Grades and achievements relative to other students are largely unimportant to me. I will work hard at assignments that I find interesting in particular.
(Female, 16/17 years old)

This particular participant suggests that personal interest is far more important than the motivation provided by positive academic assessments but implies that this is not the case for all students. Indeed it was rare for participants to directly

compare the relative importance of personal interests with outcomes such as academic achievement. The importance of personal interest was usually stated in rather general terms but there were a few participants who illustrated this with reference to a specific subject:

I am enthusiastic about history because I feel that, in a way through studying our past we can also see and shape our future.

(Male, 16/17 years old)

This participant can see the use of History as a subject and has therefore developed a particular enthusiasm for studying it.

The difficulty of the work was also considered important to motivation. Some participants stated that work that was too easy for them could be de-motivating, causing them to view the work as pointless and to disengage from the task. A substantial number of students stated that a challenge was motivating for them, that the chance to test or expand their abilities encouraged them to expend effort. The examples below illustrate these points.

When I am finding something really easy and I'm getting bored I tend to stop trying because I feel it's pointless and I find this occurs at school because we are only setted for maths and I am generally one of the smarter pupils. (Female, 11/12 years old)

When someone says a task is difficult or impossible I undertake in the knowledge it will be a challenge. Motivation for me comes in terms of complicated ideas or difficult tasks. This is because I feel motivated to overcome a task or portray an idea which is seemed to be impossible.

(Male, 16/17 years old)

It should be noted that while most participants who discussed the level of challenge in their work found difficult tasks to be motivating and tasks that were too easy to be de-motivating, a small but not insubstantial proportion mentioned that tasks that were too difficult were de-motivating. A few participants combined these points of view by suggesting that balanced work that was not overly difficult but provided a suitable and achievable challenge was a good source of motivation:

I am motivated to work hard if it is a subject that interests me, the level of work set is reasonable, but also challenging. (Female, 16/17 years old)

Academic Achievement

A number of participants suggested that getting good academic grades or high scores on academic tests was a source of motivation:

What motivates me is the thought of getting good grades in tests (e.g. Yr9 SATS, GCSEs). (Female, 11/12 years old)

Personally, the enjoyment of getting good grades after working hard is the most important factor that motivates me. (Male, 16/17 years old)

A few took a similar view but from the opposite perspective – they stated that they wished to avoid getting poor or disappointing grades and test scores. A minority of participants suggested that experiences of failure or underperformance during assessment had motivated them to work harder for future assessments:

If I lack behind and get bad marks in school than that motivates me to study harder at home so that I get better marks in the next test.

(Female, 11/12 years old)

An even smaller minority suggested that a poor grade could be demoralizing and result in less effort being expended in the future:

If I don't get a good grade in maths I will sometimes think I've let myself down and not work as hard (Female, 11/12 years old)

The majority of these comments did not describe the motivational capabilities of academic achievement in isolation and linked them to plans for further study and future careers:

Getting good grades so I can get on to the course I want at university. This will mean I can get a good job and succeed in life.

(Female, 16/17 years old)

Comments about aspirations are handled in greater depth as a separate theme but it is important to acknowledge the widely held perception that they are closely linked with academic achievement.

Aspirations, expectations and the future

Participants stated that their aspirations and expectations for the future were significant factors for motivation. The quotation below illustrates the typical elements of these comments, suggesting that good grades at school are the key to attending university, which in turn has a role in dictating career options:

I have certain goals I wish to achieve in terms of grades, universities and careers. I think about the long term effects of my actions now and realise I am not going to simply be handed the opportunities I want in life, I need to work for them and eventually it will be incredibly rewarding and fulfilling.

(Female, 16/17 years old)

The answers on this theme were usually rather general, referring to a good career or going to university but not specifying a job or career. However a substantial proportion of participants did make explicit particular aspirations:

I intend to study medicine, this requires a high level of achievement which motivates me to try my best. (Male, 16/17 years old)

High hopes for the future to have a professional job as a lawyer. The prospect of going to university and living the 'uni life'.

(Female, 16/17 years old)

There were some variations within this theme. Some of the participants suggested that their aspirations were based on a desire to provide for family in the future:

...Getting good money, making myself and my family proud, to help support my own family way in the future, to have nice holidays and travel lots... (Female, 16/17 years old)

While a small minority suggested that a lack of aspiration could actually lead to uncertainty and have a de-motivating effect:

The fact that I don't know what I want to do/be as an adult means I am prone to losing motivation. (Female, 16/17 years old)

Competition

A number of participants reported that the desire to outperform peers or achieve scores or grades that put them at the top of their class provided them with a source of motivation:

I strive to be top of the class... If people are better than me in any subject, I think I HAVE to beat them. (Male, 11/12 years old)

No participants explicitly stated that competition could be de-motivating. The participant below illustrates this form of academic competitiveness but states that he would be satisfied with being 'equal' of his peers, indicating a desire to avoid being seen as inferior:

I have a certain desire to prove myself as either the equal or better of my peers academically. (Male, 16/17 years old)

Participants expressing competitive ideas were often keen to qualify them, suggesting that competition may be somehow unacceptable if excessive:

Although many people would say that comparing is wrong, I think it is an excellent way to make people work harder. (Male, 16/17 years old)

... I am also a show off and enjoy being best and I don't care what other people think about me... (Male, 11/12 years old)

There is slight unease evident in the first quotation with regard to expressing a desire to outperform peers but the second is defiant, suggesting a willingness to ignore any negative opinions about competition or high performance that may come from others. This second type of response was very rare and a small number of participants explicitly stated that they did not want to be competitive, perhaps to avoid being perceived as arrogant:

Challenging myself to do the best that I can. For me, NOT because I want to be better than everyone else. (Female, 16/17 years old)

Praise, criticism and recognition

It was common for participants to state that praise from parents, families and/or teachers had a positive impact on their level of motivation. This sense of wanting

to please others with hard work in school was mostly not about receiving praise but about making other people feel proud of them:

The things that motivate me to work hard at school are parental support and teachers' appreciation. I like pleasing my parents and showing that all their love and support have influenced my schoolwork. Also, my teachers greatly appreciate me working hard, showing that I enjoy their teaching and helping other members of the class.

(Female, 11/12 years old)

One of the main things that motivates me is to make my parents and my family proud. (Male, 16/17 years old)

This was mirrored to an extent in participants' answers to the question about what was de-motivating for them. While no participants stated that they were de-motivated by praise or the pride of others, a few stated that a lack of recognition had a negative effect on them:

Getting no recognition or congratulations, people are just like 'oh she got another A again, who cares' and that makes you want to throw the towel in and give up because what's the point in working hard to get As if people don't recognise you for it? Yes, I would feel happy that I got the A but in the end, if no one cares, I won't care and won't work hard.

(Female, 16/17 years old)

While no participants explicitly mentioned avoiding shame or disappointment from family members or teachers as a de-motivating factor, a number of participants said that criticism from others had a negative effect on motivation:

I don't like being criticised – I respond poorly to it especially if I have worked hard; it's makes me frustrated and tempted to give up.

(Female, 16/17 years old)

No participants stated that they found criticism to be constructive or something that motivated them. The quotation from the participant above suggests that criticism is particularly demoralizing in cases where it occurs despite hard work.

A final element to this theme that was articulated in a small number of answers was the impact of parental and teacher expectation. In these cases the high expectations of others was mostly considered to be motivating, with participants suggesting that they desire to live up to or fulfil these expectations:

The fact that people often expect you to be really good makes you try to fulfil that. (Female, 16/17 years old)

A few participants stated that they felt de-motivated when placed under too much pressure to perform academically:

Pressure – too much work in terms of volume distorts your perspective and attitude to work (Female, 16/17 years old)

It is unclear whether these relatively rare cases are referring to pressure from the weight of expectations of others or from the demands of a course.

Self-esteem and psychological rewards

This theme deals broadly with internal psychological factors that influence student motivation. It is particularly relevant to the thesis because it incorporates ideas that could be described as being incremental or entity in nature. Though answers that demonstrated elements of either type of theory were not common there were

clear examples of participants who made comments about intrinsic motivation that appeared linked to one or the other. Some of these statements hinted at an entity theory driving aspects of intrinsic motivation. The below example states that intelligence needs to be ‘proved’ rather than developed, suggesting that it is a fixed parameter that can be measured.

... proving my intelligence to myself (Male, 16/17 years old)

Another example (below) suggests that the participant experiences a helpless reaction when encountering failure, driven by a belief that they have reached the peak of their ability and expending further effort would be pointless.

... if I get a mark below what I feel I should have got in a subject when I’ve worked hard, I find myself asking ‘What’s the point in trying when I don’t get the marks I want when I do?’ (Female, 16/17 years old)

There were also a small number of answers that appeared to reflect incremental theories by hinting at a desire to learn and a satisfaction with the learning process. This desire seems to be viewed as a part of personality. Participants did not usually suggest where it came from, with the example below suggesting that they may not consciously know:

... I think I’m self-motivated most of the time. It’s like there’s this desire to know stuff. (Male, 11/12 years old)

The student below appears to view learning and gaining knowledge as virtuous:

... I believe that you should always try your hardest to grasp something, even if you do not always succeed. This means that if you don’t understand something, if you keep trying, then you will get hold of it quicker than if you keep saying that you can’t do it... I get motivated to work harder

because I know that it will pay off in the end because I can expand my knowledge and do well in tests. (Female, 11/12 years old)

It should be noted that entity and incremental type comments were quite rare for these questions, with most participants preferring to draw attention to external factors. It is also important to state that the above examples infer theories of intelligence – none of the participants explicitly articulated that their beliefs about intelligence affected their motivation.

Also encompassed in this theme are more general expressions of motivation through internal processes, often quite vague in nature. Answers of this nature were not common but tended to refer to general feelings of positive affect as a result of working hard:

The desire to do my best – I get a feel good factor from working hard.
(Male, 16/17 years old)

A very small minority also stated that they simply did not feel motivated and they were not happy when completing academic work:

I am not very motivated, especially when it comes to homework. I feel motivated when I'm feeling happy. I feel happy when I'm not doing work. I also feel happy when I've completed all my work. (Male, 16/17 years old)

Peer relationships

A large number of participants mentioned interactions with peers as being important to motivation. The participants tended to divide peers into groups; discussing 'friends' in a way which was distinct from how they discussed other members of the class or year group. A substantial number of participants

suggested that working with, or simply being around, friends could have a positive effect on motivation by providing extra support through team work or by making the experience of studying more enjoyable:

I enjoy working in groups or with friends as this means that I am able to share any difficulties that I may have and am able to sort them out.

(Female, 11/12 years old)

My friends motivate me as they help make work fun.

(Female, 11/12 years old)

Working around friends was not always positive. A number of participants stated that being around friends could be distracting and therefore de-motivating. The participant below spoke of how being with friends was distracting:

Other distractions. Girls, games, drinking and generally making merry.

Short term gratification is exceptionally, well, gratifying.

(Male, 16/17 years old)

When participants commented on peers that weren't friends they were most often referring to negative effects on motivation. This was most often due to the poor behaviour of peers making the working environment too noisy or distracting:

I think working with people who are badly behaved would put me off because I would find it hard to concentrate on the work given. Also, a noisy environment would encourage me to talk and get distracted.

(Female, 11/12 years old)

The negative effects of teasing and bullying were also commented on by a number of participants, many of whom felt that their hard work made them a target:

People calling me teacher's pet, I'm better than some of my friends and I don't want to make them feel bad. (Female, 11/12 years old)

Being bullied – it really puts me off my work as I retaliate sometimes, and I wonder what will happen to me. (Male, 11/12 years old)

The first of the above quotation suggests that the student is somewhat embarrassed by their high ability and does not want to damage her friendships by appearing superior. This type of statement was fairly rare but those that answered the question in this way felt social pressure as a result of achieving more highly than their friends and peers. The participant below suggests that this pressure has a negative effect on her motivation, causing her to deliberately withhold effort:

There's a general mentality and stereotype that people who work hard are not fun to be around and have no social life, and so I occasionally 'dumb down' my performance in order to avoid these conventions. I am much more motivated this year, but when I was doing my GCSEs I often handed in homework late or not at all, just so I didn't stand out from everyone else too much. (Female, 16/17 years old)

Personal issues

Though relatively rare, a number of students suggested that personal issues could distract and de-motivate them. In a few cases the participant would refer to personal problems (without elaborating on what these might be), but the most common of these was feeling tired, usually due to lack of sleep:

Nothing really except occasionally being tired but that's because I should have gone to bed earlier not because school is boring
(Female, 16/17 years old)

Extrinsic rewards

Participants that mentioned tangible rewards as a motivating factor were relatively rare and none of the participants discussed such extrinsic rewards in relation to negative connotations. The more common answers were regarding school prizes such as awards, certificates and house points:

I think the thought of getting a prize at awards evening motivates me, however if the year before I did not get a prize; my confidence levels drop and it feels like a hard uphill battle. (Female, 11/12 years old)

It is arguable that this type of prize is not an extrinsic factor because it is related to gaining recognition from others rather than the actual prize itself. A few participants mentioned gifts or money from parents as a reward for hard work or high achievement, while a small minority mentioned that they were claiming an Educational Maintenance Allowance (EMA) (see DirectGov, 2009), which motivated them to stay in school and work hard.

If I work hard at school, my dad buys me gorgeous presents.

(Female, 11/12 years old)

EMA because money is important so I can go out with my friends which helps my own confidence. (Female, 16/17 years old)

Overall, extrinsic rewards were not well represented in the answers, though many of the answers about aspirations suggested that extrinsic rewards in the future were motivating in the present.

Discussion

This discussion is divided into three parts. The first interprets the findings from the comparison between the quantitative and qualitative measures of theory of intelligence and also deals with the analysis of the qualitative content. The second part interprets the analysis of the two open questions about motivation, focussing on the relationship between the emerging themes and Dweck's model. Both of these parts broadly relate the findings to the main aims of this thesis. The third part discusses the limitations of the research and draws some conclusions that inform the following chapters.

Quantitative and Qualitative measures:

The categorization of participants' theories of intelligence (entity, incremental or neither/both) was different on the qualitative compared to the quantitative measure for about half of the sample. There was a tendency for participants that were categorized as incremental (or, to a lesser extent, entity) on the quantitative measure to be categorized as neither/both based on their qualitative response. The aim of open qualitative questions is to elicit responses that are detailed and nuanced and so richly detailed and less easily categorized responses are to be expected. However, many of the answers clearly contradicted the unambiguous items that make up Dweck's measure, suggesting that the answers are not just more detailed but also substantively different.

It appears that when participants are freed from the constraints of using a numbered scale for providing answers a significant proportion of them reveal a nuance to their thinking that contradicts the notion that theories of intelligence can

only be either entity or incremental. Many of the participants suggested that elements of both theories may be important and that the two could be mixed together. A number of participants also identified other factors that they considered to be part of intelligence, factors that were not directly related to the entity-incremental continuum but were clearly considered important. The data appears to generally undermine the theoretical assumption that theories of intelligence are dichotomous. This may be a result of gifted and talented students being somehow different to the populations sampled in previous research or it may indicate that the theory tends to oversimplify intelligence beliefs.

Five themes emerged from analysis of the open question about intelligence; which can be briefly described as incremental theories, entity theories, mixed theories, childhood development theories and multi-faceted theories. Answers featuring intelligence beliefs that were purely or largely incremental or entity in focus were provided by a number of participants. This goes some way to confirming that these beliefs hold some ecological validity in that they exist within the gifted and talented population, even if they did not appear to be particularly prevalent.

Though it is apparent that theories of intelligence are not, as implied by Dweck (2000), entirely dichotomous, entity and incremental theories are held by a significant number of students and may therefore influence their motivation and subsequent achievement. Elements of these beliefs are likely to be important parts of attitudes and behaviour and for this reason it is crucial that incremental and entity theories are not discarded but are instead viewed in a deeper and more contextualized way. The baby should not be thrown out with the bathwater.

A common theme to emerge from the data was the mixed view of intelligence that incorporates entity and incremental elements to different extents, with participants suggesting that both learning and natural predispositions are important. Though it appears that viewing theories of intelligence as dichotomous may not fully account for the diversity of beliefs among the gifted and talented, there is some evidence here that many of these mixed beliefs could be positioned on an entity-incremental continuum. Some participants state that natural ability is most important and others stress the relative importance of learning and the environment. These points of view are different but may actually lie at different points along the same continuum, with the more unambiguously incremental and entity theories lying at opposite poles.

An alternative interpretation would be that participants are not falling between the two theories but rather that they are blending the two. Many of the participants alluded to an interaction between naturally occurring genetic ability, the environment and the expenditure of effort. This implies that some of these participants may believe that intelligence is more than just the combination of entity and incremental elements that fall onto a continuum and that in fact intelligence is defined by how these two elements work together. In other words they believe that intelligence is not the combination of incremental and entity elements but rather the interaction between them. This explanation is qualitatively different and problematic for any model based on an entity/incremental theory of intelligence distinction.

Another theme to emerge from the data was the perspective that intelligence level is largely dictated by early childhood experience. This is also difficult to reconcile with the entity-incremental continuum. On one hand it suggests that intelligence is developed through learning experiences, an incremental view, but on the other the implication seems to be that after a short but crucial period in childhood intelligence becomes relatively static, which is best described as an entity view. Those participants who expressed this belief may be vulnerable to the helpless response if they encounter failure as they believe that they are no longer capable of intellectual development once they are beyond this crucial childhood period. These participants would most likely be identified as entity theorists by Dweck's measure though they are qualitatively different to those participants who believe that intelligence is purely or largely a result of genetic inheritance. This distinction is in need of further exploration but it may not undermine the model severely – those vulnerable to the helpless response and potential subsequent declines in performance would still most likely be identified as entity theorists.

Another relatively popular theme to emerge from the data was the belief that multiple intelligences exist. Participants with this belief state that individuals have different levels of intelligence in a number of fields, distinguishing between different academic subjects and suggesting that social and practical skills may encompass different domains. Multiple intelligence theories are popular among researchers who study explicit theories of intelligence (Gardner, 1983; Sternberg, 1985) and this type of belief is not necessarily incompatible with the entity-incremental spectrum. It is possible to hold incremental or entity views about multiple types of intelligence and it is perhaps not unfeasible that individuals may

hold an entity view with regard to one type of intelligence (for example logical-mathematical) and an incremental view of another (for example linguistic).

It may be that the notion of a single entity-incremental continuum as an explanation for theory of intelligence is too general. Perhaps multiple continuums exist and individuals can hold different theories in a number of discrete domains of intelligence. Just as Gardner (1983) suggested that intelligence should be divided up into different domains it may be appropriate to divide theories of intelligence in this way. There may be general population trends with regard to these domain specific theories of intelligence. For example, Mathematics may generally inspire entity beliefs and so may be more likely to cause students encountering difficulty to react helplessly.

The popularity of the multi-faceted and mixed theories of intelligence may suggest that gifted and talented students have a more complex understanding of intelligence than their peers. It may be that their higher ability is allowing them to view the nature of intelligence more holistically or analytically and that this is reflected in their answers to the open question but is not captured by Dweck's measure. If this is the case, then it may explain why Dweck's model does not appear to apply to the sample. The inconsistent support for the model in the literature may be the result of the diverse ability levels of the populations that have been sampled. Ziegler, Heller & Stachl (1998) provide some support for this notion as they found that Dweck's model did not apply to high ability students in Germany. However, their study does not provide a direct matched comparison

between high ability and average ability groups, a comparison that would be necessary for stronger conclusions to be drawn.

The data also provides an interesting perspective on the workings of incremental and entity intelligence beliefs by drawing out a potentially important conceptual distinction between knowledge and intelligence. Although most participants did not make a distinction between the two concepts, a number suggested that knowledge could be learned while intelligence, a tool for gaining knowledge, was innate. It is possible that the relationship between these concepts may be at the heart of the difference between entity and incremental theorists - perhaps incremental theorists view knowledge and intelligence as one and the same while entity theorists separate them. If this is the case then entity theorists may not be suggesting that ability cannot be improved or that effort is fruitless, but rather that the basic cognitive structures that underpin learning are fixed. They may consider knowledge to be a more important concept than intelligence and may in fact be immune to the helpless response.

Though it was only a minority of participants that discussed the intelligence/knowledge issue it may still have been fundamental to their thinking as it is possible that those that did not openly make a distinction would make one if explicitly asked to. If this is the case then the difference between the two types of theorist may have more to do with how they *define* intelligence and knowledge than how they conceptualize them. In other words, though theories of intelligence may be based on how individuals semantically construct the concept of

intelligence, the impact that their theories have on motivation may be more a product of the importance they place on that concept relative to other concepts.

This is highly speculative. Intelligence and how it relates to other constructs is clearly complex which makes isolating intelligence beliefs using psychometric measures very difficult. Further research that performs factor analyses on items similar to Dweck's would be a good way to try and disambiguate the concepts of intelligence and knowledge. This would introduce more depth without compromising the need to quantify the concepts, a necessity for the production of generalizable research based on large samples.

Taken holistically, the interpretation of this data may have shed light on some of the findings in the previous chapter. The complexity of the theories of intelligence discussed by the gifted and talented sample is at odds with the simple entity/incremental dichotomy assumed by the model. The expected associations between theories of intelligence, achievement goals and academic performance did not occur, which may be the result of Dweck's measure not accurately capturing the complexity of the participants' intelligence beliefs. For example, for the older age group entity theorists appeared to achieve slightly better grades at GCSE than incremental theorists. If a proportion of these entity theorists actually hold more mixed views on intelligence, views that recognize the role of expending effort, than they may actually be immune to the helpless response and that may explain why their achievement was not undermined. Those identified as incremental theorists on the other hand may actually have held some entity elements to their beliefs about intelligence which may have been damaging to

their motivation and subsequent performance. This does not explain the finding, there are many factors likely to influence GCSE performance to a greater extent, but it potentially explains why the model did not appear to apply.

Motivation questions:

Ten themes emerged from the data generated by the two open questions about motivation. Though most of these themes are not immediately relevant to theories of intelligence or how intelligence beliefs influence motivation and achievement, they broadly illustrate how gifted and talented participants think about motivation. This provided some context for the thesis and also generated some ideas for the interviews. The ten themes to emerge are briefly described as: quality of teaching, engagement with subject, achievement, aspirations, competition, praise and criticism, psychological rewards, peer relationships, personal issues and extrinsic rewards. Where these themes relate to the theoretical model being explored in this thesis or to theories of intelligence, they are discussed in greater depth.

The level to which participants' personal engagement with a subject altered their motivation to study emerged as an important theme. The participants seemed to work hard if they were interested in a subject, with finding out more about the subject being the only obvious reward. Subjects that were considered boring or irrelevant elicited the opposite response, with participants suggesting that this put them off working hard. This theme could possibly be linked to the incremental theory as it is arguable that a desire to learn interesting material is only possible if you believe intelligence can be improved. However, as already discussed, this argument hinges on how intelligence and knowledge are individually defined and

the theme may be more relevant to gathering knowledge than improving intelligence. Also contradictory was the data from one participant who suggested that motivation based on personal interest may be the result of 'innate curiosity'. This could be considered to imply that natural ability may be less important than curiosity and that naturally occurring intrinsic motivation is key to intelligence.

The quality of teaching and schools was a popular theme but does not obviously link to theories of intelligence. It may simply be that good teaching and facilities remove the barriers to learning and make it easier for participants to be self-motivated. Achievement emerged as a motivational theme and achievement goals are a substantial part of Dweck's model. Participants stated that they were motivated by gaining good grades or the prospect of gaining good grades, a goal that is linked to an entity theory by the model. It may have been that participants were driven to achieve good grades because they wanted to demonstrate a high level of intelligence but it may also have been the case that they were short term goals in preparation for longer term aspirations, such as gaining access to university or getting an enjoyable or well paid job.

The theme of aspirations was linked to achieving good grades by a number of participants. Such participants seemed to be displaying a form of delay of gratification in relation to their aspirations, suggesting that working hard may not be particularly enjoyable but would be worth it in the future as it would facilitate them getting a good job or gaining access to university. These comments often linked grades to particular long term ambitions, suggesting that while grades were a source of immediate motivation this was embedded in the context of long term

aspirations. It is possible that those participants who mentioned grades but not aspirations may have thought something similar but not articulated it. While these aspirations, essentially long term extrinsic goals, appeared to motivate the participants there were surprisingly few references to other forms of extrinsic rewards (for example, prizes for high achievement). This suggests that short term extrinsic motivators were relatively unimportant to the gifted and talented and that intrinsic forms of motivation have a greater impact on effort. If this is true then studying beliefs and attitudes, such as theories of intelligence, may be crucial.

Social relationships emerged from the data as an important theme, with participants regularly expressing the desire to have positive experiences and interactions with peers, parents and teachers while avoiding negative ones. Social interactions are not part of the model but it seems likely that they do play some sort of role given their apparent importance to motivation. Competition with peers is perhaps the most strikingly relevant social theme as it may mediate the relationship between intelligence beliefs and effort. Competitiveness may be associated with entity theories because the individual is attempting to gauge their intelligence level relative to their peers. This possibility is somewhat tempered by the questionnaire data which suggested that theory of intelligence was not related to normative goals (p.147). Perhaps working hard to outperform a peer may become paramount to certain individuals, regardless of their theory of intelligence. However an entity theorist who is regularly outperformed by their peers may be more likely to become disheartened than an incremental theorist. It may be that the comparative context, such as the school, class or ability set may

mediate the affect of theory of intelligence on effort by facilitating successful or unsuccessful competition with peers.

Exploration of the role of praise and criticism, particularly from teachers, is partly what lead to Dweck's model. Dweck (2000) challenges the notion that praise from teachers is always beneficial, suggesting that it can lead to maladaptive entity beliefs, particularly if intelligence itself is praised. Many participants stated that praise or recognition was motivating for them but it was unclear in most cases whether intelligence, effort or something else was the target of this praise. Dweck (2000) outlines a number of methods (based on empirical evidence) for installing incremental beliefs, perhaps praise for effort could also achieve this. Praise and criticism are clearly important to motivation and may have an influence on theory of intelligence and therefore subsequent behaviour, but it is unclear how exactly these factors influence each other. In addition, some motivational factors appeared to be entirely internal or psychological. For example, some participants stated that they were self-motivated, feeling a personal desire to work hard that was unrelated to obvious extrinsic or intrinsic rewards. The exact nature of this self-motivation and its relationship with intelligence beliefs requires more research.

Limitations and conclusions

It is important to temper these interpretations by discussing the limitations of the research. Perhaps the most prominent issue is whether or not the coding of the qualitative data from the open intelligence question allowed for a fair comparison with the categorizations based on Dweck's measure. The most significant difference was the way in which the code 'neither/both' was interpreted. For

Dweck's measure the 'neither' category encompasses only scores that fall within a relatively narrow middle range of scores in comparison to the scores that are categorized as incremental or entity. For the qualitative data the 'neither/both' code encompasses different concepts, and a much broader range of responses.

Arguably this means that comparing the categorizations from the two measures is spurious as the two 'neither/both' categories represent different concepts. Though this could be seriously problematic for producing a detailed comparison it was not deemed too significant an issue because the aim of the analysis was to clarify whether Dweck's measure was accurately categorizing the theories of intelligence based on the theoretical definitions. The goal was not to compare the two categorizations but to ascertain whether or not participants who appeared as an incremental or entity theorists based on their scores on the measure qualitatively expressed intelligence beliefs that matched these theoretical concepts, which they did not in around half of the cases.

Another problem in this area was the wording of the open question about intelligence: *Please write a few sentences about what you understand by the term 'intelligence' and where you think intelligence comes from.* While Dweck's items focus entirely on whether intelligence can be improved, the open question disambiguates the definition of intelligence from the origin of intelligence. In a sense it is asking two separate questions, one about the definition of the concept and the other about the functioning of it, specifically where it comes from. Though it is arguable that the origin of the concept is likely to be integral to how it is defined, this does mean that caution should be exercised when considering the

interpretations of this chapter. Essentially the qualitative data was boiled down to quantitative data for the purpose of comparison and this very process limits the strength of any conclusions that are drawn.

Also an issue is that, given the limited resources of this research project, only one researcher was used to code the data from the open question. Though there were clear predefined criteria for coding that guided the process, any unconscious biases which may have affected the reliability of the coding could not be countered. Ideally multiple coders would have been used to process the data and inter-rater reliability would have been calculated to detect and correct any emerging researcher biases where possible, but unfortunately a second researcher was not available. In a similar way, the selection of quotations from all three open questions may also have been biased. Though every effort was made to select typical but articulate samples of data, the researcher's expectations prior to analysis may have led to certain themes being subconsciously sought and particular theories being supported or undermined. This was certainly not the intention but, arguably, it is not possible for a researcher to be entirely subjective (Cohen, Manion & Morrison, 2000). However, the methodical and reflective nature of the process is likely to have minimized the impact on validity and reliability as far as possible.

In addition, there may have been some social desirability effects in action that biased the data towards responses that would appear socially acceptable. For example, if competition with peers is considered negative within the peer group than it is possible that some students chose not to write it down, regardless of

whether they believed it motivated them or not. Another methodological issue with this analysis is that there was no clear way of quantifying the popularity of an idea because of the breadth of the themes. Equally demographic trends in themes could not be addressed. For example, there appeared to be a tendency for males to make competitive comments more than females but this could not be statistically tested.

The two motivation questions were somewhat different to the intelligence question in that they were more general and there was no clearly defined theory or model to guide the analysis. As a result the themes themselves are substantially broader, reflecting the aim to generate a context from which to understand theories of intelligence within the wider field of motivation. The themes here are therefore not exhaustive, nor are they finely grained. They do not represent a comprehensive overview of what motivates and de-motivates the gifted and talented in school, rather they generate ideas that help this thesis to gain a better understanding of the role of intelligence beliefs in motivation. This thesis is about theories of intelligence and how they influence goals and subsequent achievement related behaviour and this is a specific area of motivation. As such it must be viewed within the context of what motivates students even if this perspective must be kept broad.

The themes that have emerged from the qualitative elements of the questionnaire highlight that an entity-incremental model of theories of intelligence is an oversimplification that is perhaps de-contextualized from other elements of motivation, at least with regards to the gifted and talented. Though the themes

from the open questions provide some indication about the self-articulated intelligence beliefs of participants, there are missing details and layers of nuance that need to be explored and probed in more depth in order to gain a better understanding. One problem with gathering qualitative data through the use of a questionnaire is that the researcher is not able to clarify or follow up relevant points, which makes it difficult to draw valid conclusions. This issue is not so problematic during interviews as the interaction between participant and researcher allows any ambiguities to be resolved and any meaningful points or tangents to be illuminated. Email interviews that were conducted with the aim of elucidating these issues are the focus of the next two chapters.

Chapter VI: Email interviews with gifted and talented students

This is the first of two chapters which handle a set of email based interviews that were carried out with gifted and talented students. There are two sections to this chapter. The first outlines the method that was employed for the interviews, describing the sampling process, the strengths and weaknesses of online methods and the approach to data analysis. The second section provides data about the respondents along with fairly detailed case studies of four individual participants. This chapter serves as an overview of the interviews and as such much of the data analysis, interpretation and discussion are part of the next chapter.

The interviews

Following the analysis of the questionnaire data it was decided that the best way to probe the emerging themes and issues in more depth would be to conduct interviews with a number of gifted and talented students. There were three main aims that guided these interviews:

1. To examine the theories of intelligence of gifted and talented students in greater depth, exploring participants' interpretation of the concept of intelligence and accounting for the contexts in which intelligence beliefs may be relevant to the individual.
2. To explore whether participants divide intelligence into different sub-categories (or domains) and, if so, to examine how they conceptualize these different domains and whether their beliefs about the stability of these different types of intelligence vary.
3. To allow participants to freely discuss intelligence and motivation in a way that allows them to raise anything they feel is important and to explore these tangents as they emerge.

These aims were more guiding principles than concrete research objectives.

Though some structure would be provided by pre-formulated questions, it was hoped that the participants would guide the discussion and introduce potentially important elements of their own accord. In this way relevant factors that are not considered in Dweck's model or the broader research literature could emerge.

Method

The decision to use emails as not only the point of contact for the interviews but also the medium for interaction was based on three main factors. Firstly, the use

of computer mediated communication to conduct interviews is a relatively new and innovative approach, which is in itself attractive. Mann & Stewart (2000) discuss the use of the internet as a tool for qualitative enquiry, suggesting that it is still relatively unexplored and underused. There appears to be little research that uses either email interaction or other forms of computer mediated communication and even less literature on the validity and reliability of data gathered in this way. This is perhaps surprising given how important information and communication technology, particularly the internet, has become in everyday life and how rapidly it continues to evolve. In 2008 over 1.5 billion people worldwide were identified as internet users, just under a quarter of the global population, a figure that included 48.5% of all Europeans (Internet world statistics, 2008).

Information and communication technology is particularly prevalent in Britain. In 2008 sixteen million homes (65% of all homes in the UK) had access to the internet, and this proportion has been steadily increasing each year for nearly a decade (National statistics, 2008). As social networking through specialist websites becomes increasingly popular (ComScore, 2007) and email communication becomes standard both commercially and domestically it could be argued that qualitative methods may be failing to embrace a very important medium of human interaction. If, as appears to be the case, people are frequently communicating using computers, PDAs, and mobile phones with online capabilities, then the internet is a medium that provides a valid alternative to face to face interaction and may provide a useful alternative methodology for researchers. This research attempts to use the relatively novel approach of computer mediated communication to collect data by drawing on email

communication as a resource and working within the novel parameters that this naturally enforces.

The second reason for choosing to use email communication instead of face to face interaction was practical. The geographical dispersion of the sample posed a significant problem for this study as conducting face to face interviews may have required national travel on behalf of either the researcher or the participants. This would have been financially costly, time consuming, and may have deterred participation. Mann & Stewart (2000) suggest that online methods provide "...a means to minimize the constraints of time and space" (p.5), constraints which were considerably important given the limited resources available. Email interviews provide the researcher with the ability to communicate with participants almost instantaneously regardless of geographical location and this was a significant advantage.

Another practical benefit came from the fact that data generated by email interaction is much easier to handle because it arrives in electronic form (Mann & Stewart, 2000). Essentially the qualitative data for this study was attained in a fully transcribed form. Unlike most data that comes from face to face interviews it did not need to be converted from the aural medium in to text form for the purposes of analysis. Arguably this has a significant methodological advantage on the grounds that a layer of researcher interpretation is removed because the data is not transformed in any way. The more the data is interpreted for meaning, for tone of voice and for other cues, the greater the possibility of introducing error becomes. Another advantage endowed by the fact that the data arrives in

electronic form is that it can be edited easily into different documents to suit different audiences. Quotations can be transferred directly and precisely into word processing programmes because essentially the data is in its purest form and is arguably presented exactly as the participant intended.

Finally, perhaps most importantly, computer mediated communication through email allows participants more time to formulate their answers (Mann & Stewart, 2000). Egan, Chenoweth & McAuliffe (2006) tested email exchanges as a method for conducting interviews with individuals who had suffered traumatic brain injuries. They found that this approach empowered the participants by giving them control over when they supplied their response, allowing them time to reflect on the questions and formulate their answers. They suggest that email interviews and other online research methods may advance data collection methods for people suffering from cognitive-linguistic impairments, removing barriers that may be inherent for them in face to face interviews. It is important to note that this research was with a small number of individuals (nineteen) who were suffering from a specific type of impairment and whether these conclusions would also apply to other populations (such as the gifted and talented) is unclear.

Despite this reservation, a greater sense of control over the timescale of the interview is likely to be empowering for participants regardless of their background. In face to face interviews participants are usually required to articulate themselves rapidly during a relatively brief interview. Given more time for reflection it may be that they can consider their thoughts more deeply to generate answers that are both richer and more accurate. McCoyd & Kerson

(2006) conducted a comparison between intensive email based interviews and face to face interviews as part of a wider study on abortion. They suggest that, although face to face interviews generated rich data, "...email seemed to generate particularly detailed and thoughtful responses" (p.403). Again, this example is specific to a certain target group, but the conclusions are intended to generalize to comparisons between email and face to face interviews in all fields of research.

These practical and methodological strengths led to the decision to use emails for the interviews but there are a number of disadvantages and complications that have to be weighed against the advantages. Perhaps the most significant issue is the question of access. Despite increasing access on a global scale and the high penetration of the internet into homes in the UK, Mann & Stewart (2000) state:

Qualitative researchers need to be aware that access to the internet is a matter not only of economics, but also of one's place in the world in terms of gender, culture, ethnicity and language. (p.31)

In other words there are a number of factors related to both internet usage and the use of emails as a medium for conducting interviews that may exclude certain demographic groups and bias research findings.

Mann & Stewart (2000) describe literature that suggests that individuals from more affluent backgrounds are more likely to have access to the internet, as are males, individuals from the ethnic majority and younger people. This is certainly an issue to consider throughout as it potentially biases the demographic group of respondents. Socio-economic status, age, gender and ethnic background have all been monitored in an effort to detect such biases (**see p.120**) but it is not possible

to completely eradicate their effects on participation. In addition, the demographic breakdown of those identified as gifted and talented is biased towards the more affluent social-economic groups (Campbell et al., 2007) and more females responded to the questionnaire than males (**p.120**) and so some biases are already embedded in the research design. It is important to acknowledge this and remain transparent when interpreting the data.

Also important to note is that email is a different form of communication to verbal interaction and so draws upon different skills from both researcher and participant (Mann & Stewart, 2000). Participants' ability to articulate themselves through writing is essential for email interviews, as are typing skills, while face to face interviews require strong verbal skills. It is arguable that verbal skills are more common in society as they are learnt ahead of basic literacy skills, but it seems fair to suggest that gifted and talented adolescents as a group are likely to have sufficiently developed skills in both mediums to articulate themselves clearly and richly. Despite this it is important to be aware that those with insufficient literacy or computer skills may have been perturbed by the medium and decided not to take part. This may mean that the sample is biased towards those with relatively good literacy and computer skills.

Another important issue to consider is the relatively sterile nature of email communication in comparison to face to face exchanges. McCoyd & Kerson (2006) point out that computer mediated communication prevents non-verbal communication, such as the reading of facial expressions and body language, from taking place which may lead to misinterpretation of meaning or the

misplacement of emphasis during analysis. This is certainly a flaw of email interviews but is not as serious as it may appear. Email communication uses an entirely different set of rules or guidelines when compared to face to face interaction. Use of special symbols such as 'smilies' go some way towards compensating for the lack of physical proximity between those communicating, and the rules of 'netiquette', which are commonly known by younger people, also serve to ease this (Mann & Stewart, 2000).

With these issues discussed the process by which the email interviews were completed can be explained. A list of potential participants was drawn directly from the sample of gifted and talented students who had returned the questionnaire. One hundred and fifty respondents had indicated that they were willing to take part in a follow up study and had also provided an email address on which they could be contacted. A personalised email was sent to each of these individuals which explained who the researcher was and what the research was about. A document was attached to the email which contained six open questions that were designed to provide the email interviews with a starting framework that would facilitate the discussion (in this way they were semi-structured interviews). This document is displayed in **appendix C**.

Participants were directed to the six initial questions in the initial email and told that they may be asked follow-up questions. Participants were assured that their answers would be read only by the researcher and their input would be made anonymous in any written reports. They were also told that they were under no

obligation to take part in the research and that they could write as much or as little as they liked.

Participants that completed these questions received follow up questions (which were also numbered for ease of reference) in another email. These questions were carefully considered by the researcher and only sent out after reading through the participants' response multiple times and referring to the aims of the interview study and the broader aims of the thesis. These follow up questions usually fell into one of three categories: questions that asked for clarification on a specific or implied point, questions that picked up on underlying issues or themes and requested elaboration and questions that asked for an example to illustrate a certain point. Emails with more questions were sent after each exchange if the participant responded or did not request to break off the interview. Once the researcher felt satisfied that they had gained a comprehensive understanding of each participant's perspective he sent a final email thanking them for their input and reiterating that they were welcome to request any information that they may want and to receive copies of any reports on the research that may be produced.

It should be noted that the ethical issues that surround the use of computer mediated communication for research are somewhat different to those present in face to face interviews. For example, Mann & Stewart (2000) note that gaining written informed consent is very difficult for email interviews. This researcher simply informs the potential participant about the research and of their right not to take part or to withdraw at any time and as such assumes informed consent on response. This was regarded as a suitable ethical framework for two reasons.

Firstly, the subject matter is relatively benign and unlikely to require information from the participant that could be sensitive or harmful. Secondly, the participants had already provided consent to take part in follow up studies through the questionnaire. They provided their email address on this understanding and so were presumably willing to be contacted.

Also an issue is that the lack of face to face interaction makes it difficult for the researcher to verify that they are communicating with the intended individual. Although it seems unlikely that a participant would be impersonated, there is the possibility that a participant may have been given assistance from a parent, teacher or peer and as such may not be providing authentic responses. Arguably this issue is more about validity than ethics as participants are unlikely to suffer any significant negative consequences from being impersonated given that there are no material rewards for taking part. In addition, the instructions for participants clearly suggest that responses would not be judged against one another and should reflect personal attitudes: 'We are conducting this survey to find out more about your beliefs and attitudes. There are no right or wrong answers, we would like you to think about your answer and be as honest as possible' (see **appendix C**). Overall there were not any specific ethical concerns punctuating this study.

Analysis

The data was analysed using grounded theory, an approach designed to develop concepts and theories inductively. Grounded theory provides a set of flexible guidelines which allow the researcher to build up conceptual frameworks and

theories through the repetition of data analysis at increasingly refined levels (Glaser & Strauss, 1967; Charmaz, 2008). The researcher immerses themselves in the data and uses it to develop the conceptual tools for analysis rather than applying a set of predetermined concepts that may not be relevant to the data.

A grounded theory approach encourages researchers to remain close to their studied worlds and to develop an integrated set of theoretical concepts from their empirical materials that not only synthesize and interpret them but also show processual relationships.

(Charmaz, 2008, p.204)

One of the guiding principles of grounded theory is that there should be a constant process of analysis which begins from the moment the first data are collected. In these early stages of analysis the researcher examines the data closely and identifies important issues or emerging themes; a process which is as open-ended, as broad as possible and involves the data being examined multiple times. Once saturation point has been reached (the point at which the researcher believes the data has been explored as completely as possible) the themes and issues are abstracted into manageable concepts. These concepts are crystallized and then they become the toolset for a more advanced level of analysis in which they are used to recode the data. Once the data is coded into the concepts that were generated by the initial data analysis the final step of the analysis can take place – the concepts can be interpreted in the context of the wider field of literature.

The computer program 'NVIVO' was used as an aid to data analysis. Emails from each participant were compiled into a single text document in which the

researcher's questions and comments were coloured red and the responses from the participant were black. The data was not altered during this process, simply organized in such a way that each question was followed by the associated answer. Each of these documents was labelled with information specific to the individual respondent: factors such as gender, ACORN category and theory of intelligence (based on Dweck's measure) that was obtained from the questionnaire. The data was then used to generate a stock of codes that was gradually built up during the course of analysis. Once the researcher was satisfied that saturation point had been reached the data was coded using this stock. The list of codes and the coded documents could be edited at anytime during the analysis, allowing for substantial flexibility in the analytic process and for increasingly distilled levels of coding to be achieved.

Though grounded theory provides a rather elegant methodological approach, there are a number of criticisms of it as an approach to qualitative research that should be briefly discussed. Charmaz (2008) states that some researchers view grounded theory as seeking approval from a positivist epistemology, suggesting that there is an extent to which it betrays the constructivist roots of qualitative analysis by encouraging focus on the methods of data collection rather than the phenomenon that is being studied. Charmaz (2008) believes that grounded theory does not need to be based on the objective positivistic perspective that knowledge is available to be studied through measurement, and can be used reflectively to recognize the role of the researcher and society in constructing the knowledge.

Rather than abandoning the traditional positivist quest for empirical detail, I argue that we advance it – without the cloak of neutrality and passivity enshrouding mid-century positivism. (Charmaz, 2008, p.208)

Though this thesis will not overemphasize constructivist perspectives, instead taking a perspective of critical realism (**see chapter I, p.26**), the approach to grounded theory will be as reflective as possible and will acknowledge the role of social construction when interpreting the concepts that arise from the data.

Participants

Of the 150 students who were emailed, twenty four responded and completed the attached questions, fourteen of whom became involved in an exchange of emails by responding to at least one set of follow up questions. These exchanges can be characterized as email interviews and provide the data for the analyses presented in this thesis. The other ten respondents were excluded from analysis given that there was no follow up interaction with them and they therefore did not meet with the requirements of the method. There was no way of establishing the reasons for non-response, though it may have been that some of the email addresses were invalid, incorrect or rarely used. The final fourteen participants became involved in their interviews to varying degrees. The quantity and quality of each participant's response varied considerably, with some answering questions in rich detail, reflecting on their views and experiences, and others responding with short literal sentences. A number of participants reported enjoyment of the interview process, stating that they found it interesting or useful:

You are correct – I have learnt about learned helplessness through Psychology! Your questions are proving useful revision for my A-level exams! (Fiona, 16-17 years old)

I really hope my answers are still useful as I've really found this questionnaire interesting and it has made me question my own views several times. (Anna, 16-17 years old)

As a rough guide to the number of exchanges that took place, the majority of participants (five, 36%) responded to three emails, while four (29%) responded just twice, two four times (14%), two five times (14%) and one six times (7%). Six of the respondents were 11-12 year old females (43%), four were 11-12 year males (29%), three were 16-17 year old females (21%) and one was a 16-17 year old male (7%). There was therefore a tendency for the participants to be from the younger age group and to be female. With regard to ACORN classification, eight of the fourteen participants were categorized as wealthy achievers (57%), five as comfortably off (36%) and one as moderate means (7%), illustrating a tendency for participants to come from the more affluent socio-economic groups. Seven of the nine geographic regions that were sampled were represented in the study, indicating a reasonable geographic spread of participants.

In terms of the ethnicity of participants, one participant was 'Asian or Asian British Indian' while the other thirteen were 'White-British'. Participants' scores on the theory of intelligence measure are also worth considering: the majority of participants, eight, were incremental theorists (57%), while four fell into neither category (29%) and two were entity theorists (14%). The classifications of

theories of intelligence based on answers to the qualitative open question produced different categorizations, with eight of the participants being in neither/both category (57%), five in the incremental category (36%) and one in the entity category (7%). Overall this seems relatively representative of the sample that responded to the questionnaire, where there was also a tendency for entity or incremental theorists on Dweck's measure to be categorized as neither based on the open qualitative question (**p.181**).

Case studies

In order to try and contextualize the ten interviews this chapter includes four case studies. These cases serve to illustrate how the interviews worked and also to frame the data in the context of the participants' questionnaire data. Each interview could be referenced to the participant's original questionnaire thus gaining access to their demographic data and their scores on the theories of intelligence, achievement goal and self-concept measures. This data is incorporated into the case studies where appropriate to enrich the analysis. Though largely descriptive these case studies also attempt to interpret the data, drawing out important factors and attempting to identify where these factors interact. The names have been changed to protect the identity of the participants.

Fiona

Fiona is 16-17 years old and from the east of England. She is of White-British ethnicity, lives in a postcode that is categorized as being inhabited by 'wealthy achievers' by ACORN, and holds a theory of intelligence that could be described as incremental based on both qualitative and quantitative measures. Fiona attained a GCSE tariff score of 73 (the maximum being 80) and achieved an 'A' grade in mathematics and an 'A*' grade in English. Although her scores on the self-concept measures were not the highest possible, she appeared to exhibit fairly positive self-concept in all eight domains. Fiona endorsed performance, learning and normative goals to a greater degree than the rest of the questionnaire respondents, with the strongest difference being for normative goals, suggesting she is driven by all three goals, including a relatively strong desire to outperform her peers.

Fiona holds a very coherent theory of intelligence which is largely incremental in nature but also incorporates a number of other elements which give it more depth and flexibility. Although believing that intelligence is developed through life experience and hard work she places emphasis on the importance of experiences in early childhood, particularly those mediated through parental activity.

I personally believe that it (intelligence) is something that has to be worked for and is developed mainly in the first few years of your life. I believe that early experiences and good parenting (such as giving the child extra work and teaching them concepts above their age limit) contribute to how intelligent we are in later life.

In general, Fiona is very keen to articulate how important her parents have been to her academic success and to the development of her intelligence. She states that the encouragement of teachers and peers was relatively ineffectual when compared to that which came from her parents. She was given substantial academic support at home and feels that, while she was not overburdened, she was put under an appropriate level of pressure to achieve in school.

My mother particularly helped me with my schoolwork and even before we had learnt things in class she was teaching me them at home (I still remember learning my times tables before we had been taught them in class). She put quite a lot of pressure -but not too much- on me to do well at school.

Fiona appears to emphasise the role of the environment and her parents input over any intrinsic motivational factors when discussing the development of her

intelligence. When she discusses self-motivation she suggests that her positive attitudes towards work were instilled in her by her parents.

I think that our ability to self motivate ourselves is determined by experiences in our early life such as how much other people, such as our parents, motivate and push us to work harder. From this we learn how important education is and take on values and beliefs such as this from our parents. This is then used in later life to motivate ourselves.

Her incremental theory seems to largely stem from the belief that the social, cultural and physical environment that her parents surrounded her with throughout her childhood served to develop her intelligence. This is qualitatively different from an incremental perspective that emphasises the roles of intrinsic motivation, natural curiosity and hard work, which may suggest that there are a variety of different types of incremental belief. It is possible that, if they exist, these different types of belief influence attitudes, goals and behaviour in different ways.

Despite her incremental beliefs Fiona does not necessarily believe that hard work leads to success for everyone.

I don't believe I can fail if I put 100% effort and I would blame the teacher or my mistake on the day. I believe others could still fail if they put 100% effort in as some pupils simply aren't at a level where they can understand what they are being taught so, however hard they try, they may not be able to do very well.

This does not rule out learned helplessness occurring in incremental theorists when they encounter failure, indeed persistent hard work without reward may lead to a helpless response or perhaps foster an entity belief. Fiona seems to suggest a

structure which draws on similar ideas to Vygotsky's (1978) zone of proximal development is at work, in which the learner requires a certain amount of ability or knowledge to act as a foundation for learning more advanced concepts and skills. It is important to note that Dweck (2000) does not suggest that incremental theorists are immune to learned helplessness – rather that they are significantly less likely to encounter it than entity theorists. Indeed, if participants can be trained to think in more adaptive incremental ways (Elliott & Dweck, 1988; Hong et al., 1998) than it seems likely that negative experiences could foster entity beliefs through a similar process.

Fiona has aspirations to study Psychology at university and at the time of the interview was applying to do so. She was studying Psychology at A-level meaning she was familiar with a number of theories relevant to the field of motivation and because of this she became more like a co-researcher than a participant at points. During one email she suggested that the researcher watch a television show that she had recently watched and thought would be relevant and helpful. Her answers often contained phrases common to psychological literature and she used concepts that would most likely be unknown to someone who had not studied the subject:

I think perhaps my beliefs that intelligence is not innate does affect my motivation as people who do not believe this may just assume that they were not born with a high level of intelligence and so suffer slightly from learned helplessness in that they cannot change the way they are, however hard they try.

The above quotation demonstrates Fiona's capacity to understand the role of theory of intelligence and learned helplessness at a theoretical level and to relate the attitude to other concepts (in this case motivation and achievement). Fiona's level of knowledge no doubt influenced her thinking and the course of the interview. It seems likely that this level of engagement with abstract ideas and knowledge of academic fields is more common among the gifted and talented than their non-gifted peers given their ability to deal with more advanced material.

Edward

Edward is 16-17 years old and from the west Midlands. He is of White-British ethnicity, lives in a 'wealthy achievers' area based on ACORN classification and holds a theory of intelligence that could be described as entity based on Dweck's quantitative measure but was categorized as 'neither/both' based on qualitative data from the open question. Edward's achievements at GCSE exemplify his high ability and status as gifted and talented, with a GCSE tariff score of 75 and A* grades in both English and Mathematics. Edward's has a very positive academic self-concept but is rather negative in other domains of self-concept, with the general self-concept (self-esteem) score being particularly low. Edward had an average score for his pursuit of performance goals but endorsed normative and learning goals relatively less than the rest of the questionnaire sample.

Edward initially appears to hold an entity theory of intelligence, believing that an individual's intelligence level is dictated at birth by genetics, but this is complicated by the fact that he acknowledges the importance of effort and learning in the context of achievement in school.

I think people are born with a certain level of intelligence. Obviously someone can choose to work harder and could quite easily do better than a more intelligent person who chooses to be lazy (my school is filled with examples). But I don't think that counts as actually raising your level of intelligence, just your understanding. A more intelligent person will probably find the same tasks easier if they had the same piece of work ...

While he has an entity theory of intelligence, Edward appears to make an important distinction between intelligence and understanding, viewing understanding as what is graded at school and intelligence as an innate cognitive ability to understand and process information. His comments suggest that he views hard work as a crucial part of academic success (or at least fulfilling potential) and as such he does not appear vulnerable to the helpless response.

Edward suggests that intelligence exists in different domains but does not clearly provide any criteria for categorizing these different intelligence types. He suggests that there are sub-categories of academic intelligence, split by certain abilities such as creativity rather than along traditional subject lines. He also discusses types of intelligence that are less easy to define or articulate:

In my opinion there are two types of intelligent people. One type is academic meaning that they do well at school and have a good grasp of maths/physics and so forth. I think the other is harder to describe but generally I think you can tell if a person is intelligent or not just by talking to them. I have a friend who's not particularly academic; she's more of an artistic type and her grades at A- level are hanging around the C-D borderline but her opinions on life are probably a little too wise for

someone her age, she's very deep and sees more in life than money, looks and power [which judging by what I've heard seems to be important to a lot of people]. She's probably one of the most intelligent people I know in that respect.

Though Edward himself does not clearly define non-academic intelligence, based on his description it appears to relate to social consciousness and a strong philosophical perspective on the world. Unfortunately, Edward ceased communications after three emails, meaning that it was not possible to gain further clarity on his views. It is not clear why he disengaged from the interview, he simply stopped replying.

Edward was keenly aware of how theories of intelligence may influence attitudes towards work and subsequent behaviour. Though his personal view was largely entity he recognized the value of an incremental theory for inspiring positive attitudes towards work.

I think there's two kinds of mentalities toward that. Either 'I'm intelligent so I'll work hard and make use of it' and 'I'm intelligent so I don't need to work'. Likewise with less intelligent people the attitude is 'I want to be as smart as them so I'll work hard' and 'I'm not smart so why bother?' If people from a less intelligent background thought that intelligence couldn't be changed with work then there'd be no point trying so they wouldn't be in the 6th form.

This point of view does seem to suggest that an incremental view can have a positive effect on motivation and an entity view can have negative connotations,

regardless of perceived ability level. Despite this, Edward does not believe that Dweck's model is of particular relevance or importance to him:

... my opinion falls neatly into one of those categories but unless I wanted to know what to say to be outside the box it doesn't really mean anything to me.

Edward's input, though somewhat truncated, provides a good example of how theories of intelligence and the related attitudes and behaviours are not usually clear to students and are buried in semantics and context. Edward thoughtfully and articulately mused on the topics and demonstrated an ability to reflect on the issues and gauge their importance at a number of different social levels. Though holding an entity belief he was not dismissive of progress made through learning and effort which arguably suggests that he may not be vulnerable to the helpless response. Cases like his serve to demonstrate how an entity-incremental continuum for defining intelligence beliefs, though useful, fails to account for the competing concepts and attitudes that are used by gifted and talented students.

Kathryn

Kathryn is 11-12 years old and from the east Midlands. She is of White-British ethnicity and lives in a 'wealthy achievers' area based on ACORN classification. Kathryn holds a theory of intelligence that could be described as incremental based on Dweck's quantitative measure, but was categorized as 'neither/both' based on the open question about intelligence beliefs. She has a positive self-concept in both academic and non-academic domains, including positive self-esteem. Compared to the other questionnaire participants she endorses both

performance and normative goals to a greater degree (particularly the latter) while endorsing learning goals to a lesser than average degree. Kathryn was particularly articulate and thoughtful for her age when compared to the other participants.

Kathryn defines intelligence itself in terms of cleverness and knowledge and therefore integrates these concepts. She makes distinctions between knowledge, cleverness and intelligence, while, to an extent, measuring the worth of each in terms of academic aptitude. For Kathryn, intelligence is not just cognitive ability (which she defines as cleverness) but also the knowledge gained from learning. In addition she believes that intelligence can be divided into two sub types.

...in my opinion there are different forms of intelligence. I have named them practical intelligence and academic intelligence. Practical is the amount of common sense you have and how well you assess situations that you are put in. Academic intelligence is whether or not you are gifted in learning the theory work.

Kathryn does not believe you have either one or the other type of intelligence, and believes that it is possible to be high in both practical and academic intelligence.

Kathryn's theory of intelligence clearly mixes elements of both incremental and entity theories. She states that intelligence is 30% genes and 70% effort, believing that factors such as 'brain power' and memory are important genetic factors but both are relatively less important than hard work. Though acknowledging the role genetics have played in her high ability she is very keen to point out how hard she has worked to realize her potential and believes this to be the main reason for her academic success in a variety of subjects.

You can be born intelligent but if you do not bother with anything and do not work hard and put effort in, it will not be reflected in your grades that you are clever. ...My parents were clever so I have their genes. However, my intelligence is mainly down to effort that I put in to my work. I work extremely hard in every subject. I always listen and concentrate, which is then reflected in the work that I complete. I am the only student in my form to gain all A grades for attainment. Some of that is due to my natural intelligence and common sense however mostly it is down to the effort that I put in to every piece of work.

Kathryn values hard work to an extremely high degree and believes that her efforts have lead to her having a high level of intelligence. In this regard she holds an incremental theory of intelligence but, unlike Fiona who largely believes her upbringing was responsible for her high ability, she credits high intrinsic motivation for her intelligence. Kathryn states that she is motivated by making those important to her proud as well as receiving awards and recognition and her longer term ambitions to gain access to a good career – she would like to be a scientist or an astronaut.

Kathryn is very interested in sports and says that she has good ability in both football and netball. She suggests that the physical aspects of sport make genetic predispositions relatively more important for achievement when compared to more academic school subjects, though still suggests that hard work in training is the most important factor for success.

Again it depends on your motivation. If you really want to do well in sport then yes it will be quite easy to work hard in lessons, train outside of

school and work on skills. It doesn't require as much mental thought as learning an academic subject however a lot more physical work. But in some cases you can't be good at everything and some people just aren't built for sport. If their parents' didn't like sport then that may have an affect or if their parents don't encourage them then that may also have an affect.

Kathryn suggests that natural ability may be important to how an individual chooses which subject they focus their effort on. She herself chose football over netball because she felt that her hard work in that particular sport would lead to better results given her stronger natural abilities. This was not the sole reason for her choice however, and a variety of social and practical factors also influenced her decision.

Kathryn believes that peers can have a substantial influence on how much effort a student expends in school. She discusses how peer pressure and bullying can have negative connotations for motivation and therefore academic achievement.

...my friends aer worried about being called names and so they don't try hard. I am lucky because I have a big group of friends who have accepted me for who I am. This is probably because I have a bubbly personality and do not boast. If I were to boast about being really clever I believe that my friends would not like me and so I wouldn't have any friends. Some of my friends are definitely worried about not fitting in if they are seen as over clever. I believe the secret is to be modest and not boast.

She states that some students are bullied if they are doing well in school and suggests that in some cases it is easier for bright or motivated students to conceal

or repress their abilities or effort in order to fit in with their peers. She herself however does not feel that this is necessary and has developed a supportive network of friends through being aware of this social issue and remaining modest.

Kathryn's case demonstrates how incremental beliefs are not necessarily devoid of an acceptance of the role of genetics and innate ability. Though her perspective appears adaptive in that it inspires hard work and resilience it is slightly tempered by the acknowledgement that success comes easier for some than it does for others. Kathryn's examples also illuminate how important relationships with peers can be for mediating the impact of intelligence beliefs on effort. She provides clear examples of the 'tall poppy syndrome', whereby those that stand out through their ability or effort may become isolated or victimized by their classmates. It is important to be aware of this social factor when developing any model of motivation and behaviour.

Nadira

Nadira is 11-12 years old and from the London area. She is of Indian (or Indian-British) ethnicity and lives in a 'comfortably off' area according to ACORN classification. Nadira holds a theory of intelligence that could be described as entity based on Dweck's measure, but her categorization was 'neither/both' based on the open question about theory of intelligence. Nadira has moderate to positive self-concepts in the different domains that were measured. Her self-esteem score was moderate but she had a positive relationship with her parents. Perhaps somewhat surprisingly her academic self-concept was quite negative, but her self-concept for mathematics was positive. Nadira was relatively attracted to

normative goals, suggesting a level of competitiveness, but was relatively less attracted to learning and performance goals than the other respondents.

Nadira defines intelligence in academic terms (though she states that she does not know if this is accurate), gauging intelligence level based on grades and examination results in school.

I would personally define the term intelligence on how good people are in tests and their work... I think that some people are naturally more intelligent than other normal people but this just means that they have to work less hard than other people. ...if you are not one of the special ones then you can still be as intelligent as them, its just that you will have to work harder.

Her beliefs about intelligence also appear to mix elements of incremental and entity theories, suggesting that base line intelligence may be natural but that hard work can increase an individual's overall intelligence. Her views on intelligence appear to be adaptive, suggesting that hard work can compensate for a lack of initial intelligence. This type of belief is unlikely to facilitate a vulnerability to the helpless response.

Nadira appears to be aware of the potentially negative effects of a belief that intelligence is stable and unchangeable, illustrating this with a story about a peer:

I knew a boy in reception who was very intelligent and got all the answers right and then when we came to juniors everyone started to do homework and various things and became more intelligent because of the extra work that they were doing. However this boy started to say that he was not

intelligent and therefore there would be no point of doing his homework and would just make him feel embarrassed.

This story appears to exemplify the helpless response but layers in two extra factors that may be important. Firstly, the boy in her example is embarrassed by his perceived lack of intelligence and this discourages him from expending effort. Though the helpless response is triggered by feelings of hopeless inadequacy the use of the word ‘embarrassed’ suggests an extra social layer that may be worth investigating. Secondly, the boy in the example was intelligent to start with and the work was easy to him until junior school. Perhaps this is an example of the pattern suggested by Dweck (2000), whereby the gifted and talented develop entity beliefs because the difficulty of the work they face early in their school careers is too easy and does not require them to expend substantial effort.

Nadira believes that the disengagement of the boy in her example was caused by overconfidence. By believing he was naturally intelligent he neglected to work hard and expand his intellect. Nadira is keen not to make this error.

I do not believe that there is any such thing like doing well without trying hard. You may be naturally intelligent but you cannot just expect the intelligence to do all the work without you trying. I think that there is an aspect of natural aspect but many times people will do worse than ordinary people because in their younger years they realised that they were very intelligent and therefore became overconfident and started to not pay attention in class.

Nadira is suggesting that natural intelligence can be problematic because it can foster overconfidence. This did not appear to be the case with the gifted and

talented students that were sampled for the questionnaire but it is certainly possible that it may lead to underachievement in some cases, particularly for those students with less adaptive attitudes, such as the boy in Nadira's earlier example.

Nadira does not believe that high intelligence means you will have high ability in all subjects and, while she does not actually state that she thinks there are different types of intelligence, she alludes to it by commenting on the 'creative mind' and the 'systematic mind'.

I do think that it is possible for some people to be better at different subjects because of the fact that if you have a creative mind then you will be very good at art and music. If you are more systematic and like strict rules then you will be good at maths and if you are not confident and wish you were other people then you will be better at drama.

There also seems to be elements of personality in her descriptions of high ability in different subjects given her interpretation of why someone may be good at drama. This further complicates the notion that intelligence may be viewed as a single, isolated parameter as this gifted individual appears to be integrating other internal and external elements into her explanations of intelligence.

Conclusions

These cases serve to contextualize theories of intelligence by providing more information about what underlies them and suggesting how they may develop. They provide rich data about how intelligence beliefs may vary between individuals and how categorizing these beliefs in to one of two sets may be an oversimplification with regard to the gifted and talented. The complexity of

thinking demonstrated by these participants is reflected in their attitudes and beliefs and their comments serve to identify factors which might augment Dweck's model. Though these cases do not represent a wide range of participants from differing socio-economic and age backgrounds, and so do not provide much basis for generalization, they do elucidate on the processes that may underlie the model. The next chapter builds on these case studies by analysing the interview data in a more holistic way, drawing out important themes and processes.

Chapter VII: Thematic breakdown of interview data

This chapter deals with the themes that emerged from the qualitative data which was gained through the email interviews. Some of these themes may have been partially explored following analysis of the qualitative questionnaire data (**chapter V**) and the case studies (**chapter VI**); however they are handled in more depth here. Six major themes emerged from the data and each is presented and described in turn, illustrated by quotations where appropriate. How the themes may be interconnected is also explored and each is interpreted and discussed in relation to this thesis and the wider field of literature.

Theories of intelligence

Theories of intelligence were the main focal point of the interviews and they were discussed in depth by most of the participants. Though both incremental and entity ideas were expressed and most participants seemed to exhibit a preference for one or the other, few of the participants exhibited a purely entity or incremental perspective and none of the participants completely dismissed the role of effort in attaining high levels of achievement (a belief which would be maladaptive according to Dweck's theory). Most of the beliefs expressed could be described as mixed theories of intelligence (defined in **chapter V, p.187**). These mixed beliefs are important to explore given their potential impact on the theoretical model. Three parts of the spectrum of mixed theories of intelligence are represented over the following few pages. The first set lean towards an incremental perspective, the second towards an entity perspective and the final set equally credit stable and unstable factors for determining overall intelligence.

One perspective on the nature of intelligence was that it was largely incremental but also influenced by innate factors. The participant quoted below, Tanya, exemplifies this point of view. She reflects on how her hard work has been vital to her intellectual development and how she has a belief that this has been more fundamental to her achievements than any innate intelligence that she may have been born with.

I think you can be born with intelligence but you have to work on getting better. Intelligence is the result of determination, hard work and hopefully ends with success... I think I may have been born with some 'intelligence' but as I said, I aim to be a perfectionist, so I work hard and my efforts help

me get high marks and grades, if I hadn't or if my parents hadn't have helped me I don't think I would have got as far. Anyone who doesn't want to try will never succeed and get high marks. (Tanya, 11-12 years old)

Tanya appears to be exhibiting a mixed theory of intelligence that is largely incremental. However she does not separate intelligence from academic achievement so the exact semantic nature of her beliefs is unclear.

Another participant's intelligence beliefs, those of Fiona, were also mixed but largely incremental. Fiona incorporated the interpretation of evidence from a television program, which she discusses in some depth:

I also saw a program the other day (which I did not have time to watch all of but I caught a glimpse) on a sperm bank which was created using only the sperm of very intelligent men. Members of the public could then use artificial insemination to have "genius babies". The program looked at where these children were now. Many of them were overachievers and the parents were very proud and believed that it was because of their genes. However, often the parents were intelligent themselves and put an immense amount of pressure on the children to "live up to their fathers" so causing the children to achieve high grades. I believed that the success of the children was not down to their genes but the beliefs of their parents. I wondered if the children would have turned out the same if the parents were told that the sperm had come from geniuses but had actually come from average men, almost like a placebo. (Fiona, 16-17 years old)

Her interpretation is rather complex and suggests that genetic and socio-environmental factors can blend together and become difficult to separate.

However, she also expresses a clear belief that it was the social rather than genetic factors that led to the high ability of those in her example.

A number of participants took a more entity-type view and emphasised the importance of innate or genetic factors over socio-environmental factors when discussing their theories of intelligence.

I think people are born with a certain level of intelligence... A more intelligent person will probably find the same tasks easier if they had the same piece of work to do. (Edward, 16-17 years old)

Edward's beliefs about intelligence are discussed in **chapter VI (p.243)**, and it is clear that he believes intelligence is innate. However his intelligence beliefs do not lead him to regard hard work as fruitless, particularly with regard to academic achievement. Instead, he believes that predispositions have a powerful effect on how good an individual is at learning. It is unclear whether or not Edward's beliefs could be maladaptive. His entity perspective does not undermine the importance of hard work in the way that may be expected based on Dweck's model because it does not dismiss effort as ineffectual, however it may discourage hard work by reducing the relative impact that effort is expected to have. It does seem fair to suggest that Edward may be less motivated to work hard at school than an individual who believes that hard work leads to both academic success *and* the incremental development of intelligence.

The participant below, Gary, has a theory which is also largely entity in nature but is complex and integrates incremental elements. When asked whether he believed

that 'intelligence' was something that people are born with or something that had to be worked for, he replied:

Both, however, I do believe that being born with intelligence is the greatest of factors to this. A footballer may be born talented but he will have to be trained in real life situations to become a top star, but you might be born bad at football and train loads but only get to play in your Sunday league matches. Yes, you do learn more at school than if you skip it, but some people (the intelligent people) have a more natural taking and understanding of problems and subjects. Being born with intelligence is the main factor and working with it will improve it by quite a bit. Like numbers, being born with it is a number in its tens whereas learning is just units... For example, Bill has a base intelligence of 50, he works hard at school and he is able to overcome advanced problems which adds on 9 = 59. Bob however, was born a bit 'thick in the upper stories' which gives him 20 for his base intelligence. He puts some effort into class-life but his lack of mindpower is a bit underwhelming for as he cannot hardly do the basic of core subjects and fails to take things aboard, so he'll get something say $2=22$. Yet, of course, this is an example; exaggeration. The point that I seemingly haven't got across is that base intelligence is much greater than the learn at school idea and it is highly unlikely for base intelligence can be beaten by it because without the ability to take factual knowledge into your head you can never learn! (Gary, 11-12 years old)

As with the previous example, though the participant believes hard work can improve intelligence he believes that this is relatively unimportant in comparison to the foundation of intelligence that an individual is born with. However, Gary's

theory is arguably less ambiguous, discussing only the concept of intelligence and not blending it or making it synonymous with academic performance. Gary suggests that baseline genetic intelligence interacts with intelligence gained through learning and that overall intelligence is not simply the sum of the two. He states that baseline intelligence dictates how easily and competently the individual will be able learn and further improve their overall intelligence.

As was the case with Edward, overall his views on intelligence could be described as maladaptive by Dweck's model because his beliefs clearly suggest that if you are born with low intelligence there is little you can do to improve it:

By this, I do believe that if you were born stupid you will forever be stupid, but if you are born intelligent AND work with it, you will become a top class student/professor/whatever your occupation might be.

(Gary, 11-12 years old)

However, arguably, the complexity of his views may counteract the dangers of learned helplessness because he recognizes the role of effort and learning. Like Edward, his perspective may be less motivating than a purely incremental one, but it still incorporates effort and socio-environmental factors.

The examples so far have focussed on theories of intelligence which are arguably just more complex versions of the incremental and entity perspectives, but not all participants rated the importance of innate and socio-environmental factors against one another. A few participants, such as Anna, chose to step outside of a continuum style debate with their explanations:

I think we are born with a certain disposition to intelligence, and it is the environment and the effort a person puts in that determines the extent to which it is fulfilled. I believe I must have been born with some kind of ability, because I've never seemed to have had to work as hard as others have in order to achieve similar results. However, this isn't to say that I haven't worked hard and that, to some extent, I have controlled my environment through the friends I made and the sort of life I have lived.

(Anna, 16-17 years old)

Anna refers to predispositions and potential and seems to balance the importance of innate and socio-environmental factors without separating them. Her view is more about how factors interact than how they sum.

Nadira offers another intelligence belief that could be described as evenly balanced between the theoretical poles of entity and incremental theories. Her beliefs have elements of both entity and incremental perspectives but she clearly thinks that effort can overcome any discrepancies in initial intelligence levels.

I think that some people are naturally more intelligent than other normal people but this just means that they have to work less hard than other people. However I feel that naturally intelligent people do not work hard enough and therefore are only good in the lower years where most people work hard. Therefore if you are not one of the special ones then you can still be as intelligent as them, it's just that you will have to work harder.

(Nadira, 11-12 years old)

Her theory of intelligence is likely to be adaptive despite the entity elements that in part constitute it. Though she believes that some individuals hold an advantage

due to innate intelligence she also believes that a good attitude and hard work can completely negate this.

In order to gain a better understanding of how ecologically valid the gifted and talented participants considered Dweck's theory to be, they were openly asked whether or not they thought incremental and entity categories adequately accounted for their theories of intelligence. The participant below, Hannah, believes that the theoretical model is not comprehensive because innate and socio-environmental factors cannot be quantified. Hannah believes that it is how these factors combine (or interact) that is important.

I think that the theory has missed the point completely because intelligence can be in the blood, but environmental factors and upbringing change the intelligence, so it is a combination of the two, but there is no exact amount of each. (Hannah, 11-12 years old)

This perspective is somewhat echoed by Anna in the quotation below:

I don't think it is really possible to divide intelligence into 3 factors. I think that the importance of each factor depends on individual circumstances. For someone 'born intelligent' genes will have more of an effect, reducing the role of the environment as it is inevitable that their ability will 'shine through', whereas for someone born without the right predisposition it will depend far more on effort and environment. (Anna, 16-17 years old)

Anna is suggesting that a person's theory of intelligence is largely dictated by their individual experience of intelligence. She appears to be suggesting that these individual experiences are too varied to warrant classification into one of three categories (referring to incremental, entity and neither).

These quotations represent only the general trends in the data and do not account for the idiosyncratic details which the participants used in their explanations. For example, the exact breakdown of innate factors varied between participants, with some emphasising the role of genetics and others abilities that were hard-wired in childhood. Both were essentially factors based on an entity perspective, though the details of this perspective differed. This was also true for socio-environmental factors and incremental perspectives. Though it seems fair to loosely place individual beliefs along an entity-incremental continuum for the benefit of interpreting the data in the context of this thesis, this approach perhaps does not account for the complexity and diversity of the intelligence beliefs that the gifted and talented participants articulated.

The core focus of the interviews was theory of intelligence and so this theme is woven throughout all of the other themes discussed in this chapter. However the main findings to emerge from interviewing gifted and talented students about their explicit theories of intelligence are that a) their beliefs cannot be easily categorized as either incremental or entity and tend to blend elements of both theories in different ways, b) though some of these students may hold theories of intelligence which have strong entity elements they may still be adaptive given their acknowledgement of the merits of hard work for academic achievement and c) some gifted and talented individuals may view socio-environmental and innate qualities of intelligence as interacting and so may not place relative values on the roles of entity and incremental elements. These findings are important to consider when exploring the other themes discussed in this chapter.

Conceptual differentiation

There was a recurring issue with participants' use of terminology. Intelligence, knowledge, cleverness, and brain power were all used by participants throughout the interviews but there did not appear to be a clear consensus on how each concept was defined. The potential importance of these distinctions initially emerged from the open question about intelligence which was discussed in **chapter V (p.214)**, but they are more obvious in the online interviews. Sometimes the terms were used to denote clearly separate concepts, sometimes they were used interchangeably and sometimes one was used to describe or explain another. In some cases these conceptual issues occurred not just between participants but also within the responses of individuals. The diversity of conceptual definitions is illustrated by the five quotes below:

I define intelligence, not as how clever you are but as how much you know, and allow yourself to learn. (Lisa, 11-12 years old)

I believe that intelligence means how clever someone is. If some has intelligence they clever and knowledgeable. Intelligence is your brainpower and IQ levels. (Kathryn, 11-12 years old)

My interpretation of the word 'intelligence' would be someone who tries hard and wants to be educated, no matter how 'clever' they are. (Tanya, 11-12 years old)

Intelligence is when someone or something is above average in mental ability, being able to think, reasonably and sensibly, when they can use knowledge in the appropriate situations. (Claire, 11-12 years old)

For a person to be intelligent they will be faster and better than others at learning new information. (Fiona, 16-17 years old)

Lisa and Tanya seem to consider intelligence to be dictated in part by motivation and willingness to learn, suggesting incremental foundations to their definitions. Kathryn incorporates multiple concepts into her definition of intelligence, including knowledge, cleverness and brain power. Claire and Fiona suggest intelligence is defined by an ability to gather and use knowledge, which suggests a mixed view of intelligence but one with an entity foundation. Overall, the concepts were used in a variety of different ways by participants. This suggests that participants' interpretation of the open questions and items in Dweck's measure may also vary. It would appear that the term intelligence, though in common use, can be defined in a number of different ways.

The concepts of intelligence and cleverness were frequently used together. Tanya, when asked to clarify her use of the two terms, said that she used them interchangeably, though she recognized that they could be understood in a number of different ways:

I would say that there is no difference between intelligence and being clever, it is just understood differently by different people.

(Tanya, 11-12 years old)

Some participants exhibited clearer definitional distinctions between intelligence and cleverness. Comments from Sarah illuminate how these distinctions may be important to theories of intelligence.

Intelligence is what you're born with, cleverness is what you work for... I think cleverness is more the academic ability, having a large amount of knowledge and knowing how to use it and having the understanding of what it means or how it works. People can increase their cleverness by

working harder and gaining more knowledge and understanding it further. However, I view intelligence as sentience really. For example, 'artificial intelligence' when referring to machinery which can think for itself. It is intelligent because it can think for itself, and that is really what I see intelligence to mean. How clever someone is is how gifted they are in a certain area of expertise. (Sarah, 16-17 years old)

Sarah suggests that intelligence is a capacity rather than a quantifiable ability. For her, intelligence does not itself hold much importance in terms of academic ability and performance; it is cleverness which is important. For Sarah, Dweck's model may not be applicable because of terminology – measurement of a theory of cleverness would be more appropriate.

The concept of knowledge also seemed to be distinct and important to some of the participants. This parallels Gary's comments in the previous section in which he described his mixed (but largely entity theory) of intelligence (p.259). Anna suggests that intelligence and knowledge interact with one another in that intelligence facilitates the gathering of knowledge.

I would define intelligence as the ability to gather and apply knowledge, rather than actually having knowledge. A person may know very little but be able to gather it effectively, understand and apply it, they may know a awful lot, but be able to do very little with it. I wouldn't call the latter intelligent, even though they have more knowledge. (Anna, 16-17 years old)

This distinction between intelligence and knowledge is clear here but it is difficult to ascertain how the concept of knowledge may influence Dweck's model. This

was not so ambiguous for all participants. Hannah appears to have an entity view of intelligence but an incremental view of cleverness:

Intelligence is different to cleverness because you can't learn to be intelligent. People can be clever, in subjects such as English or Maths, but not be so good at Art, but I don't think this is to do with intelligence.

(Hannah, 11-12 years old)

Hannah believes that intelligence is stable which, according to Dweck's model, would make her vulnerable to the helpless response and could potentially have a negative impact on her academic performance. However, Hannah also appears to believe that academic ability and achievement stems from cleverness rather than intelligence, which theoretically means that theories of intelligence are irrelevant to achievement goals and subsequent academic performance, at least for her.

It would be easy to become overly focussed on these differences in between-participant definition, but they may not be as important as they initially appear. Dweck's model focuses on identifying students who are vulnerable to the helpless response and this vulnerability is in part dictated by the extent to which an individual believes they can learn new skills, gain knowledge and improve their academic performance. Dweck's model suggests that this agency belief comes from an individual's theory of intelligence but, judging from the findings of this thesis, this appears to be an oversimplification. The online interview data suggests that agency beliefs may in fact be partly dependent on a combination of beliefs regarding intelligence, cleverness and knowledge. This thesis also suggests that theories of intelligence cannot be easily classified because individuals tend to integrate multiple factors and situational variables into their beliefs.

It may be that Dweck's model could be made applicable to the gifted and talented by bypassing the theory of intelligence and devising a measure of educational agency. Such a measure would seek to ascertain how far participants believed their own efforts could impact on their academic performance in a variety of hypothetical classroom situations. This would not replace the part of the model that examines achievement goals but would theoretically play a role in predicting which achievement goals an individual might hold (in a similar way to theories of intelligence in the current model). This alternative model would perhaps not be as comprehensive in that it does not start at the level of individual beliefs, however it may hold more predictive power for the gifted and talented who appear to hold complex, multi-faceted theories of intelligence that defy categorization.

Alternatively, in an effort to maintain the starting point for the model at the beliefs and attitudes stage, it may be preferable to adapt the measure of theory of intelligence in such a way to improve definitional clarity. For example, the exact structure of participants' intelligence beliefs could be clarified and accounted for if they are first asked to complete a measure that accesses their beliefs about the relative importance of intelligence and knowledge to academic performance. These measures would need to be carefully designed, piloted and tested to make them suitably valid and reliable. This model may also need to be adapted for different types of intelligence.

Domain specific intelligence

Dweck's model implies that intelligence is a single parameter but it can also be theorised as multiple independent subtypes (Gardner, 1983; Sternberg, 1985 - see **chapter I, p.5**). This alternative perspective was often expressed during the online interviews, with some participants suggesting either that there were different types of intelligence or that levels of intelligence varied between school subjects. In other words, these participants appeared to hold the view that intelligence was domain specific rather than a single parameter, and that intelligence could be high in some areas but low in others. Nadira is discussed as a case study in **chapter VI (p.250)**. Her perspective suggests that individual predispositions dictate, at least to some extent, how well an individual will perform in different subjects:

I do think that it is possible for some people to be better at different subjects because of the fact that if you have a creative mind then you will be very good at art and music. If you are more systematic and like strict rules then you will be good at maths ... (Nadira, 11-12 years old)

Nadira exemplifies creative and systematic 'minds' as underlying level of ability in art and mathematics respectively. It is unclear how many other different types of 'mind' she believes there are or how they may influence other academic and non-academic skills. Nadira may be expressing stereotyped views about the nature of different academic subjects, suggesting that subjects like maths do not require creativity but rather the precise application of rules and methods.

Anna also believes that individuals' level of intelligence varies between subjects based on underlying patterns of thinking:

I completely believe that people have different strengths in different areas. Maths is a very different subject to Art, which is in turn very different from Psychology. Obviously the curriculum causes certain similarities; essay writing, written exams and the like, but to look at the concept of the subjects they are quite different. To be able to work out complex trigonometry requires a different kind of thinking to creating a collage or applying psychological theory to a situation. Although, intelligence in one area is going to improve your chances in another. A cross country runner is different from a 100m sprinter, but they'd still have a reasonable chance at each other's disciplines compared to a complete novice.

(Anna, 16-17 years old)

Anna is making the point that, while an individual may be more capable in one subject than another due to their differing cognitive abilities (essentially their differing levels in intelligence subtypes), their levels of ability in different areas will correlate. By this, Anna appears to be suggesting that being intelligent in one domain means that you are likely to be intelligent in others because they overlap.

Kathryn also believes there are different types of intelligence but stipulates only two domains, namely practical and academic:

However, in my opinion there are different forms of intelligence. I have named them practical intelligence and academic intelligence. Practical is the amount of common sense you have and how well you assess situations that you are put in. Academic intelligence is whether or not you are gifted in learning the theory work. Farmers usually have practical intelligence. They are out working with animals or crops so their work is practical and

uses a lot of common sense. People such as Alan Sugar and Gordon Brown have academic intelligence. They are clever to have worked their way to such high pay and ranking in the world today. I believe scientists have academic intelligence and practical intelligence. They have to be able to assess the best way to perform experiments safely however they also must be able to grasp some of the hard concepts that science throws at you. (Kathryn, 11-12 years old)

Kathryn's breakdown of intelligence is clearly carefully thought out. Her theory seems to categorize most subjects that would be learnt at school together and so presumably her view about her own level of academic intelligence influences her motivation in school. Her comments do not make specific whether or not she believes either or both of these two types of intelligence are innate or learned.

The point of view that intelligence is domain specific has implications for the model. It may be that individuals' theories of intelligence are not just domain specific in that they incorporate different types of intelligence but also that these different types vary in their stability. In actual fact this was not common as most participants applied their theories of intelligence evenly across domains:

No, I believe that in all subjects ability is developed and is not innate. Although some may believe that subjects like Art you are born with I do not. I know a girl who is extremely good at art and so are her parents. Many people say that she was born with this amazing ability because of her parents being so artistic (like its in her blood). However, I believe that, because her parents are so artistic, she grew up around art and they encouraged her to develop her artistic skills. I believe that any other child

in her position would have turned out the same way, even if they were not of blood relation to her parents. (Fiona, 16-17 years old)

Fiona's comments suggest that her incremental theory of intelligence applies equally in all domains. Her selection of Art as an example was interesting given that it is a subject in which success or failure is not easily defined – it does not so obviously rely on learning new skills and gathering knowledge and often requires attributes such as creativity, which are considered difficult to develop. Clearly Anna believes that, despite the rather indefinable nature of artistic talent, art is still a subject for which success is based on learning and practice rather than innate ability.

Kathryn introduces the idea that cognitive abilities themselves can be learnt along with specific academic subjects:

I believe that they are linked in to your intelligence. This is because you need to have a good memory and a good range of learning styles, to have a high intelligence level. You can also work on your learning styles and memory by doing exercise to improve you intelligence. Therefore it is linked to your intelligence as you can improve your intelligence level.

(Kathryn, 11-12 years old)

Kathryn's perspective is also incremental but it could be described as focusing on intelligence itself to a greater degree. She is not simply describing learning knowledge but also how general skills can be developed that help in both the learning process and the process of manipulating and using knowledge. This is a pure incremental theory in some ways though a role for genetic predispositions is not actively ruled out.

In contrast, Anna has a mixed view of intelligence but believes that individuals have innate predispositions to be skilled in certain areas.

I definitely believe that ability in certain subjects depends on genetic predispositions. For example, Maths requires a very logical type of thinking, where the answer is right or wrong, generally, whereas Art tends to have few wrong answers. I suppose it is the core of the subject that differs; now even PE requires a certain amount of Biology and English to do well, yet being good at sport is very different from being able to complete complex trigonometry. It comes down to the whole left brain/right brain debate, and whether dominance by one results in either a creative or logical intelligence. (Anna, 16-17 years old)

Anna does not dismiss the role of effort or learning in this quote but she does state the importance of natural ability and pre-existing cognitive tendencies at the biological level. Anna also hints at the importance of non-cognitive genetic predispositions with her comments about PE (physical education). She appears to imply that physical size, something that is known to have a strong genetic basis, is important for PE which therefore strengthens entity elements of her theory of intelligence for that subject. PE is clearly considered in a slightly different way by some of the participants as Dean also gives it a specific mention.

There are some subjects that I excel at but a few like geography that I have been interested before I went to secondary school by watching National Geographic and I excel at but some do not; I am not as good in English as I would like to be and I am also quite bad at PE but these I am naturally bad at anyway. (Dean, 11-12 years old)

Edward exhibits a similar point of view to Anna but adds a layer of complexity by suggesting that different types of intelligence are not necessarily clearly linked to specific academic subjects:

I've always been far better at maths and physics than I was at English and likewise I've never been good with machines and making things either... On the other hand whenever a creative writing task came up I always got high marks so I suppose that means I'm better at creating images in my own head and working with them than picking apart something that already exists... I think maths is mainly logical thought but I still 'see' the numbers in my head. As for physics creative skills probably make it easier since it means you can picture a problem in your head and work with it that way (envisioning the way particles collide and forces act together certainly helps me). Since everyone in my maths and physics classes plays an instrument to a high level or has some artistic talent I think there must be a link. (Edward, 16-17 years old)

The intelligence types defined by Edward overlap, with logic and creativity combining to provide him with an advantage in mathematics.

A few participants did suggest that their theories about the stability of intelligence in different subjects varied. Peter states that he has a natural ability to solve mathematical problems (implying an entity theory) but needs to expend significant effort to achieve well in German (implying an incremental theory).

I am naturally good at maths and am able to do sums quickly in my head and like to challenge myself. However I am not as naturally good at

German and have to study (revise) for each test and also I learn better if I go over what I have done in the lesson when I get home. I think these two subjects are different as I, unlike my brother, am not as confident at speaking languages but know I can do maths without a problem.

(Peter, 11-12 years old)

This quotation perhaps demonstrates how a mixed theory of intelligence may function positively. Peter is aware of his natural ability in Maths and German and he may be considered to have an entity theory because of this. However he does not seem to exhibit any maladaptive patterns given that his reaction to not being naturally good at German is to study harder.

Finally, Sarah suggests that intelligence in different domains may stem from a personal liking for certain subjects.

You can be naturally gifted, have an affinity for it. For example, I am better at Physics than English but that's because I have a greater understanding of the concepts...not I have a greater intelligence in it. I enjoy the subject more as I can see the ideas... (Sarah, 16-17 years old)

Sarah appears to be suggesting that the link between intelligence and motivation is not entirely one way, with motivation facilitating learning and the development of intelligence. She suggests that intelligence can be synonymous with motivation - being able to engage intelligently with a subject is personal and motivating.

Academic factors

The majority of participants appeared to view intelligence and academic achievement as being strongly related. This link is not part of Dweck's model but it is not problematic for it either. It simply serves to demonstrate how interconnected the different concepts are – how they are not easily isolated from one another. In this way, the next three themes are perhaps broader than those preceding them because they are exploring factors that are not accounted for by the model but may have an impact upon the processes underlying it.

This theme, 'academic factors', encompasses the motivational effects of academic assessment, the impact of the examination process and how personal enjoyment of specific academic subjects can have a positive effect on performance. These academic factors link with Dweck's model at the level of achievement goals because performance goals (where the aim is to achieve positive academic outcomes) are theoretically associated with an entity theory of intelligence. Additionally, there may be a direct link between theories of intelligence and personal preferences for certain subjects because such inclinations may be associated with domain specific intelligence beliefs.

It is important to point out that participants were keen to state the extent to which academic achievement was itself motivating. The participants comments indicated that they held strong performance goals - they strived to gain good grades. This was consistent with the generally high levels of performance goal endorsement in the survey data (**chapter IV, p.135**).

My motivation come from the good grades that I know I will get if I work so hard. (Kathryn, 11-12 years old)

I have to admit I am entirely shallow in that I'm motivated by the potential glory of doing well. (Anna, 16-17 years old)

These comments were often linked to future opportunities in education and employment. Several participants stated that achieving good academic qualifications was essential to their career and life plans.

I want to work hard at school as I have learned how important good grades in exams are when you leave school. (Peter, 11-12 years old)

MY motivation is the future. If you work hard in school, you'll learn more so you will be able to get great grades in your GCSEs, cosquently, you'll be able to get a godd, highly paid job that you can put your skills to good use, so you can buy a house and maybe a car so that my future family can settle down in... (Obviously, life isn't going to be that simple but I'll give it a darn good try!!!) (Gary, 11-12 years old)

Achieving good academic grades was clearly a strong form of motivation for the participants. However, the explanations of their performance goals did not generally demonstrate any link to an underlying entity theory of intelligence. They were generally driven by a desire to achieve extrinsic rewards such as a well-paid career or a place at university. Anna's comments about 'the potential glory of doing well' may be an exception to this as they could be interpreted as representing a desire to demonstrate intelligence. However, equally, she may be referring to a sense of glory gained from success that stems from hard work or the social benefits of academic achievement. Overall, this data does not provide

evidence that directly undermines the model's posited link between performance goals and theories of intelligence but it does perhaps call into question the relative importance of the relationship. For the gifted and talented, extrinsic factors that are not associated with theory of intelligence appear to be more important to the strength of performance goals than the presence of an entity theory.

The topic of assessment by examination was raised by many of the participants. The role of examinations as an accurate measure of ability was questioned by Edward, who gave the following response when asked why he didn't like them:

Well for a start the sheer fact that it's an exam makes me people nervous and they never perform as well when they're nervous. Secondly the fact that not every exam is the same and the level of difficulty does vary a bit between years means that the same person might get a much better grade if they did the exam the year after... The best way of doing it in my opinion would be getting grades based on work you do throughout the year (a system used much more widely in America I think) or simply just the teachers assessment of you. (Edward, 16-17 years old)

Edward clearly believes that exams do not fairly represent an individual's ability given that they focus on a single time point. Some participants indirectly linked elements of Dweck's models to the exam system.

I, personally have had no experience of people doing well in summative assessments (such as GCSEs) without putting in much work. Often people brag about not doing much revision and then do poorly.

(Fiona, 16-17 years old)

Though the quote does not directly refer to intelligence, Fiona's comments about the importance of effort and revision for achieving positive academic outcomes arguably indicates an incremental theory of intelligence.

Anna recounts an experience in school which appears to represent an example of learned helplessness; the process of disengagement from a task following initial failure which is fundamental to Dweck's model:

I had a friend who was denied the chance to take the Higher Maths GCSE paper, even though she felt capable of it, and was made to take the Intermediate. Effectively being told that she was never going to be very good at Maths completely demotivated her and she didn't bother trying, mostly because she didn't think there was much point. She eventually gained a low grade, despite being actually quite good at the subject. However, I'm not sure if this was so much demotivation as losing all respect for the teachers involved. (Anna, 16-17 years old)

The expectation that the student in this example could not achieve the highest grades at GCSE appears to have caused a drastic drop in her motivation. This supports elements of Dweck's model because it suggests that the exam system and the behaviour of teachers can inadvertently cause the development of entity beliefs, which can cause an individual to withhold effort and to underperform. However, Anna suggests that the cause may also have been a breakdown in the relationship between student and teacher, suggesting that other variables complicate the process.

Comments from Sarah also suggest a scenario in which school policy and practice may affect a student's beliefs about intelligence. She challenges the term 'gifted and talented' and how students were often identified using exam results.

I think the word 'gifted' is really not the right word to use for what it is describing. To me, the term means someone who is clever or excels in some aspect. For instance, to join the Gifted and Talented Academy you needed certain grades in SATs or at GCSE, which shows that you need to be good academically to be considered a member of this group and to me that defines cleverness, not intelligence. 'Gifted' really suggests that you are born with these abilities, whereas I think you can work for them.

(Sarah, 16-17 years old)

Sarah's comments are interesting because they suggest that the term 'gifted' has connotations that link it to an entity theory of intelligence. Indeed the word 'gifted' does conjure an image of somebody endowed with ability or intelligence by a higher power. This example perhaps serves to demonstrate how terminology itself can be loaded and can substantially influence the impact of national policy.

Personal preferences for subjects seemed to be highly important to motivation.

If I found science hard I wouldn't enjoy learning about the world I wouldn't love it. I would say that it is about 60% of a good understanding and 40% for my love for the subject. (Kathryn, 11-12 years old)

In my opinion, it all depends on how much you enjoy, or want to do well in subjects, as to how good, or intelligent you are in that particular area. For example, say you adored French, where as you despised Maths, you are

more than likely going to want to, and achieve better in French, as you have an interest in it. (Lisa, 11-12 years old)

This point may appear obvious but is in fact somewhat overlooked by the theoretical model. Learning goals and performance goals are likely to be moderated by subject specific preferences that make it easier or more difficult for an individual to engage with a given academic task.

Anna provides a more nuanced description of how personal preferences for a subject may moderate an individual's level of ability for it. She discussed subjects that she had an 'affinity' with (**see p.275**); suggesting that she felt personally connected to some subjects and that this connection meant she enjoyed them more and felt more motivated to work hard on them. When asked whether she felt the subjects she had the greatest affinity with were those she was best at, she replied:

I was about say 'absolutely yes' but then wondered if it's actually being able in a subject that gives us a greater affinity. For example, I hated PE, but is it the reason or the result of my dislike for sport? If I was a sporty person, I'd probably like PE. I don't mean that to sound as obvious as it does. It's like, if you really like lasagne, you'd probably be better at cooking lasagne than a quiche. Maybe it's because they involve different techniques (like maths and art) but the fact that you like one must have an effect too. You could say that you like lasagne because you can make it, but something would have to get you to make it in the first place. So you'd have to feel an affinity for Maths before you liked the subject. But then you pretty much try everything once early on, you're quite open to anything...
(Anna, 16-17 years old)

Anna is essentially suggesting that there is a feedback loop between a student's affinity for a subject and their ability for it. An individual becomes better at a subject because they enjoy it more and then begin to enjoy it more because they become better at it. This pertains to the theoretical model only if domain specific intelligences are also integrated.

Anna clarifies her points within the context of the school system by discussing her choice of subjects at GCSE.

Up until about Year 9, I think I tried equally hard in every subject and worried about my grades in all of them. Perhaps choosing my GCSE subjects introduced me to the concept of 'leaving' subjects I wasn't so good at. I didn't put any effort into Physics for the most of my Physics AS because I thought there was absolutely no point because I didn't like it and found it really hard. However, in Psychology I'd read around the topic and quite often look into things further or discuss the topics outside of the classroom, because it interests me and I'm fairly good at it. Even maths, I'd find myself looking at a situation and wondering how it would be modelled in Mechanics. (Anna, 16-17 years old)

This quote clearly suggests that the interaction between Anna's enjoyment for particular subjects and her ability to perform well in them has influenced her educational decisions. Her extra-curricular activities were also dictated by these personal affinities, with extra, non-essential work being carried out in some subjects but minimal effort being expended in others. Her achievement goals and general motivation-related behaviours are being moderated by her preferences.

Anna arguably suggests that she reacted helplessly to finding Physics difficult but this was moderated by her dislike for the subject and her decision that she would not be studying it later on in her academic career:

And I think that putting effort into a subject that i'm not good at is pointless, I might as well put that effort into something which is going to bring greater reward. Perhaps that's shallow and perhaps that makes me a bit of a quitter, but it just seems the logical thing to me. I mean, if it was something I really wanted to conquer, then I'd keep at it.

(Anna, 16-17 years old)

Despite initially stating that she does not work hard on subjects she is not good at, Anna suggests a level of resilience to hardship at the end of this quote. She appears to be implying that the ‘helpless reaction’, when occurring in certain contexts, may be partly conscious. In some cases the decision to withhold effort or ‘quit’ may be pragmatic, based not on deep seated beliefs about an inability to grasp a subject but on a logical analysis of how relatively enjoyable, relevant and important it is. Certain situations may therefore facilitate hard work even if the subject is deemed too difficult, bypassing any maladaptive reactions.

Overall, academic factors are clearly important elements for explaining the processes that influence the theoretical model and are likely to form part of a complex explanation as to why the model did not seem to apply to the gifted and talented sample. Participants’ beliefs about the domain specific nature of intelligence and ability are perhaps reflected in personal preferences for certain subjects, preferences that may have a profound effect on academic decisions and outcomes. These academic factors also shed light on how the directionality of the

model may function by suggesting that there may be some backward linkages such that academic achievement can influence achievement goals which may in turn influence theory of intelligence. Participants' decisions about how much effort to expend on a given subject may be informed by their previous performance in academic assessments.

Internal factors

This theme encompasses a number of different factors which may moderate elements of the theoretical model but are not directly accounted for by it. These ‘internal factors’ are essentially individual differences in relevant attitudes and behaviours such as self-motivation, personality and confidence. Many of the participants were keen to point out how these personal factors influenced their motivational behaviour and their attitudes towards school performance.

Self-motivation (intrinsic motivation) was raised as an important factor for academic success by a number of participants. Fiona talks about a personal drive that comes not from social or extrinsic rewards but from her own cognitive ability to focus when necessary. She believes that this is something personal that cannot be taught.

...I am also able to motivate myself better than anyone else (a skill, perhaps, which lower achieving students have not yet mastered) and so I can get down to work and motivate myself to do it when needed (chocolate usually helps!) ... I believe that motivating yourself is definitely a necessary skill for success and one that cannot be taught.

(Fiona, 16-17 years old)

Fiona’s theory about self-motivation appears to have an entity basis - you are either self-motivated or you are not. In her view the ability to self-motivate is a necessary skill for academic success and so presumably a lack of self-motivation is deeply problematic for students. This point of view is an interesting one as it suggests that a ‘theory of motivation’ may also moderate the processes outlined in the theoretical model. If this were the case it would be likely that theories of

intelligence and theories of motivation would be linked – perhaps an individual does not believe they can increase their level of self-motivation if they believe that their level of intelligence is also fixed. This is speculative, but again it illustrates the array of different variables and definitions that may be important when studying implicit theories.

Fiona complicates the idea that self-motivation is a fixed personal characteristic further by suggesting that it is the result of early childhood socialization rather than genetic predispositions:

I think that our ability to self motivate ourselves is determined by experiences in our early life such as how much other people, such as our parents, motivate and push us to work harder. From this we learn how important education is and take on values and beliefs such as this from our parents. This is then used in later life to motivate ourselves.

(Fiona, 16-17 years old)

Fiona is suggesting that an internalized work ethic is instilled (or not) during childhood by parenting (see also **chapter V, p.191**). This further complicates any simple ‘fixed-fluid’ interpretations with regard to implicit beliefs about the nature of self-motivation because it suggests general stability but with periods of fluidity throughout the life course. Fiona’s beliefs about motivation are clearly multi-faceted and complex and this, along with her ability to articulate these ideas, may be borne of her high ability.

Not all of the participants were as apparently self-motivated as Fiona. Anna considers herself to be rather poor at making herself work and suggests that this is because she is rarely stretched by difficult work at school.

I'm not good on self motivation, possibly because I never really needed to as I tended to find my work pretty easy. If I hit a subject or a particular area that I find difficult, I'm only motivated enough to give it 2 or 3 goes before I decide that I'll never be able to do it. I'm really bad at revising and doing homework because I can't get past the fact that I don't want to do it. (Anna, 16-17 years old)

This quote suggests that Anna could be vulnerable to a helpless reaction in the face of difficulty, which could indicate an entity theory (indeed, Anna was classified as holding an entity theory by Dweck's measure, though based on her qualitative response to the open questions she was classified as 'neither/both'). This reaction to difficulty may proffer some clues as to how educational policy may influence the intelligence beliefs and motivational behaviour of the gifted and talented. Anna is used to finding work too easy and so sudden challenges appear to cause her difficulty. Perhaps if policy provided more challenging work for gifted and talented students throughout their school career, students such as Anna would develop more adaptive responses to difficulty.

It is important to note that self-motivation was not necessarily equated with working hard and prioritizing school work:

... I balance my lifestyle between doing my school work, and having time for myself, to just relax, and hang out with my friends, after all, I am still a kid, and school work is important, but it isn't everything.

(Lisa, 11-12 years old)

To be honest I never even thought too much about what my opinions were on the subject until I got mailed the questionnaire.

(Edward, 16-17 years old)

Lisa's comments serve to help counter the potential for over-interpreting data of this type. These participants were asked to talk about intelligence beliefs and motivation in school and obliged. However, their lives provide a much broader context that cannot be captured during such a brief interaction. Their comments are likely to be valid but the relative overall importance should not be overstated.

Along with self-motivation, some participants also discussed how elements of their personality influenced their behaviour.

I'm not a very talkative person, I suppose, so I'm not particularly good at expressing my ideas in words so I prefer Maths or Physics where you just have to write the correct answer down. (Sarah, 16-17 years old)

Sarah is suggesting that her personality has influenced her efforts, and therefore development, in different subjects. Gary also perceives a strong link between personality and intelligence:

I theory that all the subjects and how well you do in them comes from your personality and skills, in which I believe come from your parents and your Zodiac sign, I am a Libran, which means I am naturally diplomatic and very artistic and creative, and I am very good in art, story-writing, poetry and cooking which I have achieved a new liking in and successfulness.

(Gary, 11-12 years old)

Gary's beliefs about intelligence being domain specific originate from a combination of ideas about predispositions, parental guidance and personality. The addition of personality into the formation of participants' domain specific theories of intelligence generates further questions about how stable participants believe personality is and whether personality itself influences intelligence or whether it simply influences preferences for learning certain types of material.

Some participants discussed specific elements of personality that influence motivation. Tanya discusses her tendency towards perfectionism:

Although I don't like to admit it, I am a perfectionist and I like everything to have a very high standard (which sometimes even I can't reach) so after a performance where other people and I may have gone wrong on one or two points, I am sometimes disappointed with it and consequently get a lower mark... Total perfection is impossible, there are too many things to work on but as a goal makes you work hard. I suppose that I'm almost 'scared' of getting a low mark or grade because I don't want to become some of the less interested people at school but also because I know what I want to become in the future and I don't want others putting me off. I interpret perfection as halfway of success, getting what you need.

(Tanya, 11-12 years old)

Perfectionism is considered relatively common in the gifted and talented and there is some evidence to suggest that is linked to which types of achievement goal an individual will adopt (Neumeister, 2004). According to Neumeister (2004), fear of failure (because of a desire to achieve perfect scores) could lead to the adoption of maladaptive performance-avoidance goals, while self-orientated perfectionism,

which refers to a desire to improve or acquire new abilities, can lead to mastery goals. Assuming gifted and talented students are more likely to be perfectionists, the relationship between perfectionism and achievement goals could provide part of the reason why the data for the gifted and talented sample did not fit the model.

One participant, Anna, stated that her high ability was intertwined with her identity, which she links with her changing levels of motivation:

I do think ability and achievement is a part of my identity, although I think it's importance has dwindled over the years as I became more confident and had less need to stand out in this way. Perhaps that could explain why I've found it harder and harder to motivate myself over the years, as my confidence has grown, the importance of my schoolwork has lessened... Actually, I was a very shy, quiet child when I was little, so perhaps I felt this was my way of standing out, my way of defining who I was, rather than being the confident, popular child. (Anna, 16-17 years old)

Anna is suggesting that as her confidence has developed her high ability has become less important to her identity and this has resulted in her declining levels of self-motivation. It may be that self-identifying as a 'gifted' student or a 'perfectionist' may moderate motivation and therefore the achievement goals of the model. Theoretically, a gradual developmental decoupling of identity and school performance may explain why the older students in the sample seemed to generally endorse learning and normative goals to a lesser degree than the younger students (**Chapter IV, p.146**). As school work becomes less important to the gifted and talented student's sense of self they become less motivated to

prioritize academic achievement goals. More research is required to clarify the relationship between identity and motivation.

Another internal factor that emerged as relevant to the model was confidence, both with regard to performance and ability to overcome difficulties or challenges. Hannah and Nadira suggest that over-confidence can be problematic and lead to underachievement in academic assessment:

I recently got worse results in a maths test than I expected. I think this was because I overestimated my own intelligence and didn't take the time to revise. (Hannah, 11-12 years old)

...many times people will do worse than ordinary people because in their younger years they realised that they were very intelligent and therefore became overconfident and started to not pay attention in class.

(Nadira, 11-12 years old)

This issue of confidence links with an entity theory of intelligence in that the complacency stems from an individual's belief that they can achieve well through natural ability rather than hard work.

Despite this concern about confidence many of the participants suggested that they were actually very resilient to setbacks to their confidence:

If I were to fail, when I had worked so hard, I don't think I would be discouraged to put that much effort into my other work, it would probably be the complete opposite, I would try to put more effort into my work, to achieve the standard of work that I deserved. (Lisa, 11-12 years old)

(Failure)... would be a blow to my confidence and I would feel I have wasted my time working so hard. But it would not stop me working hard in the future as maybe my mark could have been worse if I had not tried... It would also tell me to work harder to try and up my mark.

(Peter, 11-12 years old)

The comments of these participants suggest that they would not respond helplessly to failure and would react in an adaptive way, increasing their effort and striving to succeed at the next attempt. Sarah provides a contextualized example of her resilience to such a setback:

For example, I had a difficult question on a Physics homework once, which I looked at and thought 'I can't do it', which made me want to do it even more, and I usually end up doing those sort of questions first.

(Sarah, 16-17 years old)

Though the general opinion appears to be that confidence can be gained and undermined, nearly all of the participants suggested that they would not respond helplessly. Confidence may somehow moderate the model but it does not appear to be an issue for the gifted and talented, perhaps because they are generally high in confidence in their academic ability given their past experiences of success.

Finally, Sarah illustrates how managing her expectations has helped her to maintain a positive attitude towards academic performance:

I don't think I have a 'can do' attitude, I'm much more pessimistic. I think, particularly with exams, if you expect the worst, you won't be disappointed, which I prefer to finding out I haven't done as well as expected. It's the same thing with the 'can do' attitude. If I'm very positive

about something and am sure I can do it, I will be very disappointed if I can't, however, if you expect not to be able to do it, you will be much happier and feel more accomplished when you do... I think for some people being a pessimist would hinder their ability to do some tasks, but not for me particularly. I'm really only a pessimist when it comes to exams and getting the results. In other tasks if I think I can't do it I'd be more motivated to prove to myself that I can, so I'd work harder. So if anything being pessimistic improves my performance and my willingness to work harder. ...It also makes me feel like I've achieved something when I do manage to do it... Then again, this optimism is not always a positive thing. If someone is so optimistic that everything will turn out great and they will get top grades because they've put a lot of work in can be very disappointed if it doesn't all work out. They would receive a bigger knock to their confidence than those who are more pessimistic and will be pleasantly surprised or not at all. (Sarah, 16-17 years old)

Sarah's comments serve to illustrate how attitudes, in this case optimism and pessimism can fluctuate or adapt between different contexts.

Sarah appears to be taking conscious control of her expectations in order to maintain a healthy level of confidence and to avoid situations that may be damaging. Gifted and talented students could also be applying this flexible approach to other elements of the theoretical model. Perhaps some individuals also adapt their theory of intelligence or achievement goals in order to gain greater pride or avoid disappointment when presented with a given context. For example, an entity theory may allow a student to feel positive if they perform relatively well

but negative if they perform relatively poorly. However, in the latter scenario perhaps they incorporate incremental elements into their theory to suit the context, maybe by blaming a lack of effort or a certain situational factor. Dweck's model assumes that intelligence beliefs themselves are stable but this may not be the case. As Sarah appears to demonstrate, attitudes may change depending on the situation. Perhaps this could provide part of the explanation for the failure of the model to account for the gifted and talented. Perhaps the gifted and talented population are relatively more adaptable in their beliefs, allowing them to respond positively to a variety of situations.

Peers, Parents, family and society

This is another broader theme, this time exploring important social influences on the model. The participants spoke at length about the role that their parents and peers played with regard to their attitudes and motivational behaviour. This section includes the discussion of how the factors of parental guidance, peer relationships, competition, social stereotypes and social expectations tie into the model to perhaps moderate elements of it.

A few participants discussed how parents had instilled within them important academic achievement related values and had guided their academic careers.

I definitely believe that parents are the most important; at least they were in my upbringing... Neither of my parents went to University and my father has no formal qualifications. However, both of them, particularly my mother, share the same values as someone with a high level of education. My father realizes that, although he now has a fairly high level job, he had to work extremely hard to get there and regrets leaving school before his O-levels. Although my mother did not attend University, she did do well at school and has passed her belief onto me that a high level of education is the foundation to a successful life. (Fiona, 16-17 years old)

Fiona clearly feels that her parents have provided her with strong achievement goals. It is worth noting that her parents were not themselves successful in school and that it was more important that they encouraged her and socialized her with positive values towards academic work. Claire also discusses how important her parents are to her attitudes towards school work:

...the background of my parents has helped me to be more motivated in school work, as you don't want to let them down and to a certain extent you want to excel past them. They are encouraging and don't patronise me, whilst excepting that sometimes there are things i don't want to do.

(Claire, 11-12 years old)

Relationships with peers were also discussed by a few participants. Anna believes that her friendship groups were largely dictated by ability grouping that was imposed by her school.

... all my friends were in mostly the same classes as me. It's logical that you make friends with people in your classes as they're the people you first meet and spend time with, but it does have the effect of forming groups of people with generally comparable academic ability.

(Anna, 16-17 years old)

It is unclear whether such grouping has been positive for her motivation and academic achievement, but given that her classmates tend to share similar academic values it seems likely that she has been largely immersed in a social environment that expects high achievement. Tanya provides an example of how working with like-minded peers can be academically beneficial:

One of my own experiences is that me and my friend were in a science lesson and there was a diagram of a cell on the wall and there was part of it called endoplasmic reticulum and we didn't know what it was so we went down to the library and found out. If you ask most under-achieving students, most of them will tell you that they hate school.

(Tanya, 11-12 years old)

One of the measures included in the questionnaire examined normative achievement goals. Competition with peers and siblings was raised as a relevant issue by a few of the participants.

I think some competitiveness also makes me work harder. In lessons, if there's a particularly difficult question the teacher sets us to work on, which I think I won't be able to do, and everyone else is trying to do it too, I try harder to do the question and try to do it first.

(Sarah, 16-17 years old)

Sarah describes how competitive contexts can facilitate normative performance goals which can have a positive impact on motivation and performance. In more general terms, she also discusses a competitive relationship with her sister which appears to provide a constant form of academic motivation for her.

I do agree that competition is a good form of motivation for me. I think most people would agree that if you really like a subject, you want to be the best in it, especially if it's supposed to be the subject you're most apt at. I'm not sure where the competitiveness comes from because I think I've always been like that so it hasn't developed or anything. It could have been intensified, I suppose, by having a younger sister. Academia is really where I do best so I feel I have to do better than her, although it sounds awful. I think when we were younger it was about gaining attention from our parents. If I come home with full marks on a test, I'll get a 'well done' and more encouragement, not that we weren't encouraged anyway and our parents didn't ignore us or anything, it was just about getting more attention than each other. My sister and I haven't really been very good

friends anyway, maybe because there's such a small age gap compared to my friends who get along very well with their sisters. Now we're older though, I think the competition comes from other students at school rather than each other, and it's actually for personal achievement, rather than attention. (Sarah, 16-17 years old)

Though there was an element of competition running through the comments of a few participants, there were also those who were not particularly competitive.

I'm not really competitive with my classmates that much, this could be because i really don't like a lot of them and see them as a waste of time or just because there is no need to compete, when you could be revising or have fun. (Claire, 11-12 years old)

Overall, competition between peers and family members may moderate normative achievement goals for some of the gifted and talented students in this sample but this may be a factor that affects the model for some individuals but not for others. Some may revel in outperforming peers and strive for normative goals while others define success personally. This is linked to the model but at the same time may not be relevant for theories of intelligence, which focus more on performance and learning goals than normative ones.

One factor that seemed important to a substantial number of the participants was how social stereotypes associated with expending effort or achieving positive academic outcomes may influence motivation.

There are definitely benefits to being the 'clever one', trust with teachers, lots of credit for your work etc but the drawbacks are definitely the names,

boff, boffin etc and the stereotype you get as being perfect all the time, not having a life, being the teacher's pet. It can really pull you down at the best of times although i will never give up working hard.

(Tanya, 11-12 years old)

Tanya describes a social stigma associated with high achievement that can lead to bright students being bullied by their peers. Kathryn's comments elaborate on this, suggesting that fear of being socially isolated can lead to some students being tempted to hide their abilities or 'dumb down'.

Yes my friends aer worried about being called names and so they don't try hard... I know a boy in my year who is really clever but he is in with the wrong crowd. He is in top set for everything but is always in trouble and acts like he doesn't care to impress his mates. I am lucky because I have a big group of friends who have accepted me for who I am... Some of my friends are definitely worried about not fitting in if they are seen as over clever... I believe that there is some pressure to hide your abilities.

However for me I am proud of all of my achievements and believe that I should not hide my abilities. Because I have a good personality and I do not boast people have accepted me. However I would want to hide my abilities if I had no friends and I was being bullied because of my talent.

(Kathryn, 11-12 years old)

These quotes suggest that the social context can somehow mediate the strength of performance and normative achievement goals. Tanya feels torn between wanting to receive praise for her efforts and wanting to avoid being teased by her peers but she states that this has never caused her to reduce her effort. However, Kathryn

talks about feeling pressure to hide her high ability for fear of being ostracised by her peers. Though Kathryn herself has developed strong friendships and mechanisms for protecting herself from such social pressures, she implies that others may be more influenced by them. Social pressure to appear less keen may cause certain susceptible individuals to reduce the strength of their learning and performance goals in order to strengthen their relationships with peers.

Anna talks specifically about the 'gifted and talented' label and the social implications of its use within the school system:

I do think the 'gifted and talented' label can rile others. I quite often witnessed people who weren't involved in particular G&T activities question why they weren't good enough, why they weren't allowed to have a go. Although, I don't know whether it's upsetting enough to be demotivating. I had one particular friend who was always disgruntled at not being classed as G&T, but she still worked well and achieved over her target grades, so I don't imagine she was particularly demotivated. Perhaps, in a way, it actually encourages people, makes them want to achieve the same 'status'. Although, I think some people were more annoyed because they weren't going on the trips, rather than because they felt demotivated. (Anna, 16-17 years old)

Anna was the only participant to discuss this issue and gives no clear opinion about whether or not being identified and categorized as gifted and talented can have negative social connotations. However it is an issue specific to the population sampled and the policy that guides provision for it. Further research

into the motivational effects of being identified as gifted and talented is required and including social elements to this would be recommended.

Along with attempts to avoid negative social connotations, some participants discussed how they would seek to elicit pride from their families.

My motivation probably comes from the prospect of making myself, and my parents, proud of me. (Lisa, 11-12 years old)

... my motivation comes from the fact that I can build up a good reputation for myself and make my family, friends, teachers and myself very proud...

You build up a reputation and respect from others which is really nice.

(Kathryn, 11-12 years old)

The desire to make others proud clearly motivates these students to achieve positive academic outcomes. However, Claire expresses a slightly different notion, that she wishes to avoid letting others down.

I am motivated by not letting my family down or having to borrow money from them. (Claire, 11-12 years old)

These two perspectives seem to reflect aspects of performance-approach and performance-avoidance achievement goals. Claire is concerned about the social connotations of failure while Kathryn and Lisa are attempting to succeed for the associated positive social outcomes.

Anna's perspective is more contextually specific in that she feels that she needs to justify her choice of secondary school:

I don't really know who I'm aiming to impress, everyone, I suppose... I went to the 'rough' school that everyone tried not to go to. I loved it and

am always very defensive of it and so I think there is a bit of trying to show people that you can do well at that school. So, I suppose that means I'm trying to impress the teachers at my primary school, my friends' parents and anyone that ever looked down on me for choosing the school I did.

(Anna, 16-17 years old)

This quote illustrates how motivation can be drawn from individual social contexts. Anna is not just trying to make her parents or teachers proud she is trying to gain retrospective approval for a decision she made which was not socially accepted. It seems apparent that a complex mixture of social pressures can influence both academic achievement goals and motivation more broadly.

Summary

A number of key points have emerged from the thematic analysis of the interview data and are summarized below:

- Incremental and entity theories of intelligence were expressed by different participants. However, most were ‘mixed’, including elements of both types of intelligence belief to differing degrees. The complexity of the participants’ theories of intelligence means that identifying beliefs which may lead to maladaptive behaviours is likely to be problematic. For example, even those participants who had theories of intelligence that were largely entity in nature believed that hard work and resilience were important elements for academic success.
- Participants employed differing uses of key terms such as ‘intelligence’, ‘cleverness’ and ‘knowledge’. The varying use of these terms raises issues with regard to validity and reliability in theories of intelligence research.
- Most participants expressed the view that intelligence was domain specific in that it could be broken down into separate cognitive abilities or subject specific skills. A few of these participants also believed that some of these domains were stable (an entity view) while others were fluid (an incremental view), suggesting that intelligence beliefs could vary by domain at the individual level. Dweck’s model takes a generalized view of intelligence which may fail to account for domain specific beliefs.
- A number of factors pertaining to schools and the academic system were raised by the participants, most notably how personal preferences for subjects may influence task engagement and academic achievement goals

specific to them. The data implies that participants are more likely to react helplessly when faced with failure or challenge in subjects that they do not like or feel are unimportant.

- Intrapersonal variables such as confidence, personality and self-motivation appear to have the potential to moderate elements of the theoretical model. Some participants suggested that personality could moderate domain specific intelligence and personal preference for subjects, while perfectionism could influence performance goals. Overall, the participants appeared to have adaptable attitudes and beliefs which suggested they were hard working and resilient to failure.
- Social relationships and interactions appeared to be very important to the participants and this could mediate elements of the theoretical model. Normative goals manifested themselves through competition and performance and learning goals could be increased or decreased depending on the social context. A desire to make others proud was motivating but a fear of being ostracised by peers was de-motivating.

With the research that was conducted for this thesis now described and discussed in depth, the next chapter will draw the different strands together and outline the conclusions, limitations and implications.

Chapter VIII: Conclusions & implications

This thesis has drawn from a large sample of English gifted and talented adolescents, gathering quantitative and qualitative data from a questionnaire and from email interviews. The different aspects of this research have been discussed in depth in the preceding chapters and this final chapter aims to bring all of these aspects together to briefly summarise the research as a whole and to provide a broader perspective to the thesis. There are three main sections. The first summarises the findings and draws together a set of conclusions based on the research questions, the second acknowledges the main limitations of the findings and the third discusses the implications of the research and provides suggestions for future studies.

Conclusions

This thesis has generally included a discussion section for each chapter which has interpreted and critiqued material specific to a certain phase of the research. This final chapter will examine these findings in a more holistic way, drawing broad conclusions where possible. In order to synthesize the findings and develop an overview it is important to return to the six research questions that guided this thesis, which were first presented in **chapter II (p.89)**.

1. Test Dweck & Leggett's (1988) model with regards to gifted and talented students, using academic performance in national assessments as an outcome variable.

This question was explored largely through quantitative analysis of data gained from the questionnaire. This analysis is discussed in depth in **chapters III-V**. The main 'headline' finding is that the data gained from the gifted and talented sample does not appear to support the theoretical model proposed by Dweck & Leggett (1988). Analysis of the data did reveal one of the expected associations: intelligence beliefs which were more incremental were associated with stronger learning goals. However, stronger entity beliefs were associated with better GCSE attainment, a finding that contradicts the model's expectation that such beliefs cause maladaptive behaviour and subsequent underachievement. In addition, performance goals, considered by the model to be associated with the entity theory and therefore underachievement, were not statistically associated with theory of intelligence but they did have a positive relationship with GCSE

attainment (see **chapter IV, p.147**). Overall, the data did not fit the theoretical model, failing to support some of the proposed pathways and contradicting others.

Research questions four and six go some way to summarizing possible explanations for why the patterns expected by the model did not occur, however there were also two main clues in the questionnaire data itself. Firstly, the level of achievement at GCSE was generally very high, with over one-fifth of the older participants achieving the maximum possible tariff score. This restricted range of values causes validity issues (associated with analysing data of limited variance) and it also suggests that the gifted and talented are not sufficiently stretched by GCSE assessments. **Chapter IV (p.167)** discusses how this lack of challenge may foster an entity theory. If the high achievement of the students in the sample does reflect a lack of significant academic challenge, and therefore a shortage of experience in coping with failure or difficulties, then helpless reactions may start to manifest themselves at a later stage of the school career when work becomes more difficult. This is speculative but represents a theory worth pursuing.

Secondly, the relationship between achievement goals and implicit theories of intelligence may require closer inspection in the case of the gifted and talented. Their generally high endorsement of both learning and performance goals suggests that they are highly motivated as a group in such a way that the link between intelligence beliefs and these differing goal types becomes irrelevant (**chapter IV, p.135**). The motivational processes that the gifted and talented operate may be unique to them, causing them to act in a way that disassociates the key components of Dweck's model. Though based on relationships within the

empirical data, this is again speculative. The only conclusion that can be stated with conviction is that the data from the gifted and talented sample does not support Dweck & Leggett's (1988) model.

2. Explore differences within the sample with regard to gender, age, socio-economic status and ethnicity.

The analysis of quantitative data from the survey revealed that socio-economic status and ethnicity were not statistically related with either theory of intelligence or achievement goals, though this may have been in part due to lack of variability in the data for these variables. However there were some differences between the two age groups that were sampled (11-12 and 16-17 years old). The older students' intelligence beliefs were closer to the entity perspective (though still largely incremental), while they also endorsed both learning and normative goals to a lesser degree. The only gender difference was that females endorsed normative goals to a lesser extent than males. This analysis is discussed in depth in **chapter IV (p.146)**.

These findings are perhaps not surprising as there is some support for such differences in the existing literature. Studies by Ablard & Mills (1996) and Leondari & Gialamas (2002) found that pre-adolescent children are more likely than teenagers to hold incremental intelligence beliefs. In addition, Shim, Ryan & Anderson's (2008) longitudinal study found that the importance of goals declined over time – as their sample grew older they endorsed all achievement goals to a lesser degree. Dweck (2000) suggests this is because of a pervading entity theory

in society that gradually socializes individuals to believe that attributes and traits are relatively stable (**chapter II, p.67**). This is speculative but certainly provides a realistic explanation.

Alternatively, shifting intelligence beliefs and falling achievement goal endorsement may reflect differing school policies between year groups or developmental and social life changes. Adolescence is a time characterized by rapid change and it is probably a combination of several factors - pinning down the most important of these requires further research. This thesis offers the tentative conclusion that socio-economic status, ethnicity and gender are not factors related to theory of intelligence but that the theories themselves may be prone to demonstrate age-related differences. This suggests that theory of intelligence is not as robust a belief as the model suggests, at least not with regard to the gifted and talented.

3. Ascertain how, if at all, self-concepts are related to theory of intelligence and achievement goals.

The relationship between the variables of the model and self-concept is discussed in **chapter IV (p.154)**. The evidence that was gathered to explore this question was probably the least conclusive given the highly skewed distribution of the data. Self-concept in the academic domains and general self-concept (self-esteem) was very high and as a result very few interpretable associations could be identified. Nearly all of the academic self-concepts were correlated positively with each other and the achievement goals suggesting positive goal endorsement was linked

with positive self-concept. There were a few significant correlations that may provide some insight into how social relationships may be related to intelligence beliefs. Theory of intelligence was negatively correlated with both peer and parental relationship self-concepts, suggesting that less incremental beliefs were somehow related to less security in social relationships. In addition peer and parental relationship self-concepts were positively associated with both performance and learning goals.

Given the lack of empirical data about causation these findings are difficult to interpret. The possibility that entity beliefs could lead to unforgiving social encounters is briefly discussed in **chapter IV (p.170)** but this interpretation lacks empirical support. It may be that positive social relationships help motivate an individual and this is reflected in their achievement goals or it may be that high endorsement of achievement goals helps strengthen relationships with peers and parents. A bi-directional relationship in which there is a feedback loop between goals and social relationships is also a possibility. Making strong conclusions on the basis of this data is inappropriate but there is certainly reason to explore the relationship between self-concept and the model further.

The email interviews provided some clues about how self-concept may relate to implicit theories of intelligence and achievement goals. Some participants suggested that their perceptions of their own ability in certain academic subjects had influenced their motivation within that subject. Specific academic self-concepts may therefore mediate domain specific intelligence beliefs and achievement goals (**chapter VII, p.283**). Peer relationships also emerged as

important to motivation. A few participants suggested that fear of being ostracized by friends and class mates may lead to the lowering of performance goals in some circumstances (**chapter VII, p.299**). Strong performance and learning achievement goals may therefore be vulnerable if an individual has a negative self-concept with regard to their peers and wishes to raise it by appearing less studious and therefore raising their popularity. This would likely be entirely dependent on the context and whether hard work, learning and achievement were valued by that particular peer group. These are propositions for enhancing the model rather than conclusions. What does appear clear is that if an individual feels positive about themselves they are more likely to endorse both learning and performance achievement goals.

4. Qualitatively explore the theories of intelligence of gifted and talented students and ascertain how, if at all, they differ from the theoretical framework of the model.

This question was explored using both the questionnaire and the email interviews. The comparison between the coded qualitative statements about theory of intelligence and the categorizations based on Dweck's (2000) measure is discussed in **chapter V (p.178)**. There was a substantial difference between the categorizations produced by the two measures such that the qualitative measure tended to produce more 'neither/both' classifications than Dweck's. The qualitative answers often either fell between entity and incremental theories, blended elements of the two in a unique way, or incorporated elements related to neither theory (**chapter V, p.187**). A number of participants did clearly hold

either the entity or the incremental perspective, which demonstrates that these are implicit beliefs that do exist in the population. However, just under half of the participants expressed beliefs that could not be categorized, contradicting the notion that individuals' beliefs can be divided into either 'entity' or incremental' categories, as is implied by the model. The data suggested that some participants could be placed along an incremental-entity continuum, while others had belief structures too complicated to be accounted for in this dichotomous way.

The email interviews produced data that was used to explore these theories of intelligence further (**chapter VII, p.256**). Implicit theories appear to be personally constructed and idiosyncratic as each participant had a unique perspective on intelligence and how stable it is. Many combined entity explanations regarding genetic predispositions with incremental explanations of intelligence regarding a positive environment and hard work. A few also stated the interaction of these factors was more important than each factor in isolation, expressing theories of intelligence that were complex. Based on these findings it is fair to suggest that the model may be an oversimplification of intelligence beliefs, at least with regards to the gifted and talented.

Domain specific intelligence emerged as an important part of many of the participants' implicit theories of intelligence (**chapter VII, p.269**). Participants generally believed that intelligence was best divided up into different types, sometimes into academic subjects and sometimes into more general cognitive subtypes (e.g. creativity, systematic). Most participants who held such domain specific beliefs appeared to apply their implicit theory of intelligence in a

generalized way, treating each domain as being equally stable or fluid. The evidence suggests that domain specific intelligence beliefs need to be considered by any theoretical model though in most cases beliefs about the malleability of intelligence is applied equally across all domains.

Finally, a few participants used differing conceptual frameworks to define intelligence and this raises questions about how individuals form their implicit theories (**chapter VII, p.264**). The concepts of intelligence, knowledge, motivation, and personality were often used in differing ways with some equating knowledge and intelligence and some suggesting intelligence was a tool for acquiring knowledge. In addition some participants linked intelligence with personality and intrinsic motivation, suggesting that these factors were stable facilitators of high intelligence. For these participants, intelligence itself may have been considered malleable but it was linked with unchangeable traits and was therefore limited by these additional parameters.

This suggests that the use of the concept of intelligence may differ between individuals and this is problematic for the model. It seems that stating a simple model for how these apparently complex intelligence beliefs may influence achievement goals and subsequent behaviour may be fruitless. Overall, many of the participants' theories of intelligence incorporated multiple variables or viewed intelligence in a nuanced way and so defied simple categorization along an entity-incremental continuum.

5. Explore how theories of intelligence may or may not be important to gifted and talented students in the school context through use of qualitative research methods.

One of the aims of this thesis was to use qualitative measures to maintain a broader perspective on the model and motivational processes in the real world (**chapters VI and VII**). Dowson & McInerney (2003, 2004) stress the importance of examining achievement goals in context and the email interviews and case studies provided some data pertaining to this. It is important to note that the participants did not generally consider theories of intelligence to be particularly important to motivation in daily life. Most of the participants explicitly based their endorsement of performance and learning goals on other inter and intrapersonal factors or on extrinsic rewards such as career aspirations. Many of these factors were fluid and relied on elements of the specific situation, while some focussed on how the individual responded in certain scenarios.

Performance goals, which were mainly defined in terms of national assessments, were often considered an extrinsic form of motivation given their importance for unlocking academic and career opportunities (**chapter VII, p.276**). Though attitudes to work were considered important for shaping performance goals, the need to achieve them was most commonly based on these longer-term practical goals. Performance goals appeared to be mainly a means to an end rather than the product of deep-seated attitudes or beliefs. Factors pertaining to teaching and the school environment were also considered key elements to the endorsement of achievement goals, with poor teaching or facilities likely to impact negatively on

learning goals by reducing participants' enjoyment of work (**chapter VII, p.276**).

Based on this data it could be argued that the model over-emphasises the role of intelligence beliefs in the formation of achievement goals and in fact other factors are more important.

As briefly discussed with regard to research question three, social relationships were viewed as a very important influence on motivation as interactions with peers were considered capable of influencing achievement goals (**chapter VII, p.295**). The desire to impress parents and peers, which could be viewed as a social goal, appears to be able to reduce or enhance achievement goals – if the social context means that pride is attained through effort and achievement than goals can be enhanced but in other cases teasing and bullying can create a negative context that can lead to the reduction of achievement goals. It may be concluded that extrinsic motivation supplied by both aspirations and the social context, which can vary between schools and even individual classes, may have a key role in influencing the pursuit of achievement goals – a role which may override that of theories of intelligence.

6. Draw out possible differences between gifted and talented students and the rest of the student population by using the existing literature.

This final research question was dependent on the analysis and interpretation of the other five. The literature review (**chapter II, p.75**) describes how Ziegler, Heller & Stachl (1998) and Ziegler & Stoeger (2004) both found that Dweck's model did not apply to gifted students in German gymnasiums, with the former

study also demonstrating that incremental theories and performance goals were *both* highly endorsed by this population. These findings were clearly echoed by this thesis. The data did not support the theoretical model and this may be because the gifted and talented are a unique population. The characteristics associated with being gifted may not fit with the assumptions of Dweck's model or, alternatively, elements of giftedness may crucially interact with components or processes of the model in such a way to prevent it from applying. It is therefore important to tentatively compare the results from this thesis with the literature.

It was apparent that the participants involved in the questionnaire study were a highly motivated group and that their high endorsement of all achievement goal types undermined the theoretical model (**chapter IV, p.151**). Gottfried & Gottfried (1996) suggest that motivation is an integral part of giftedness and that the concept of 'gifted motivation' should be used to describe the population's relatively high drive to succeed (**chapter II, p.72**). Perhaps a specific inbuilt quality such as 'gifted motivation' means that the gifted and talented may be more predisposed to pursue multiple achievement goals (both performance and learning) than the general adolescent population and this may explain why the model does not apply to them. It can be cautiously concluded that the gifted and talented are more likely to endorse both performance and learning achievement goals than the wider population.

A desire to achieve 'perfect' work emerged as an important influence for one interview participant and Neumeister (2004) suggests that perfectionism is more common among the gifted and talented than the rest of the population (**chapter**

VII, p.289). The generally high endorsement of achievement goals in the questionnaire data may be in part related to perfectionism. At a more speculative level, Phillips and Lindsay (2006) explored motivation in gifted and talented students and suggested that the population is competitive and highly motivated by extrinsic rewards (**chapter II, p.71**). This was supported by generally high endorsement of normative achievement goals (**chapter IV, p.151**) and the participants' discussion of the association between high academic achievement and the long-term extrinsic rewards of a good career (**chapter VII, p.277**).

Drawing strong conclusions based on these findings is not possible without a direct comparison group and limitations such as this are discussed in greater depth in the next section (**p.318**). What is apparent is that there is likely to be something different about the gifted and talented in comparison to the populations sampled in the majority of the literature that accounts for their lack of compatibility with Dweck's model. This thesis has identified gifted and talented students as a unique group in terms of the model, explored them as a heterogeneous group and identified some theories based on the empirical evidence that require further exploration. These are discussed in the final section of this chapter (**p.326**).

Limitations

The limitations of this thesis have been discussed throughout but usually with direct reference to a specific element of the research or literature. This section discusses these limitations in a more general and summative way, highlighting where broad assumptions and design decisions may have influenced the validity or reliability of the findings. This overview is not included to undermine the conclusions but rather to frame them within the limitations, allowing the reader to think about the research in a reflective way without over-interpreting the findings.

One important broad limitation to consider regards the use of terminology and definitions. **Chapter VII (p.264)** highlights how participants often defined key concepts in a variety of different ways when asked to explore them qualitatively. Though the items that form the measures in the questionnaire are designed to avoid ambiguous language and to reliably measure a single concept it is possible that the myriad of terms and concepts explored in this thesis are being interpreted differently by each participant. This could mean that the conclusions being drawn are not based on psychological differences between participants but differences in semantic interpretation.

For example, some participants identified as incremental theorists by Dweck's measure may in fact have been misclassified if the participant considers knowledge and intelligence to be synonymous. If they were asked to clarify their definition it may emerge that they believe in limitations to learning and may therefore in fact be vulnerable to the helpless response. This is a difficult issue to account for and is likely to be an inherent problem in much of the research of this

kind. The use of qualitative interviewing in this thesis has attempted to explore this possibility to an extent but there are always validity issues when a researcher attempts to interpret information that is essentially filtered through the language and communicative abilities of the participant.

A related issue is how ‘gifted and talented’ is defined in this thesis and the way in which this definition has been used to select the sample (**see chapter I, p.15**).

Analysis of the achievement data supports the notion that the sample has high ability (**chapter III, p.125**) and could therefore be considered gifted and talented based on actual academic achievement. However, the term ‘gifted and talented’ is loaded with social meaning and definitional ambiguity and as such the specific definition used in this thesis may be, to a certain extent, incompatible with those used in the rest of the literature.

Comparing these differently defined ‘gifted’ samples is further complicated by this sample’s inclusion of the concept of ‘talent’, which is usually excluded in the rest of the literature. A range of methods were used to identify NAGTY members and so, depending on the criteria which are used, it could be argued that the sample does not validly represent only the gifted. Overall, this issue is hard to counter as it is a problem that permeates most of the literature on the gifted and talented, particularly given that it is an internationally used concept that is culturally or politically defined. This thesis cannot bypass this issue – only acknowledge it.

A significant issue with this thesis is that it attempts to draw conclusions about how the nature of giftedness may impact on the model but does not base these assertions on a non-gifted comparison group. The reasons for this lack of comparison group were largely financial and practical but also theoretical to an extent: it would have been challenging to define and identify a suitably balanced 'non-gifted' sample (see **chapter IV, p.172**). This lack of direct comparison means that the conclusions based on how 'giftedness' may influence the model are speculative but this does not negate the fact that they are based on carefully gathered empirical evidence. This thesis provides guidance for potential follow up studies (**p.331**) and the qualitative data provides a starting point from which to understand the psychological processes that may underlie the motivational behaviour of gifted and talented adolescents. It is important to realise that the findings are based on largely explorative research and so to avoid extrapolating too much from them.

There were some concerns with regard to how representative the sample is of the age, gender, and socio-economic status of the gifted and talented population.

Though a stratified sampling procedure was used the respondents were disproportionately likely to be female and more likely to be from the younger age group (**chapter III, p.120**). In addition, consistent with the NAGTY population as a whole, participants were disproportionately likely to be resident in the most affluent ACORN category (**chapter III, p.124**). **Chapter IV (p.171)** discusses this issue in more depth but in general terms it is apparent that for some unconfirmed reason individuals from certain demographic subgroups were more likely to respond than others, which is problematic in terms of validity. Though

few demographic trends were identified through statistical analysis (**chapter IV, p.146**) this finding may have been different had the sample been more balanced.

A participant in the pilot study raised an issue over social desirability with regard to some of the questionnaire items (**chapter III, p.100**). The issue of how honestly participants respond to questionnaire items and the extent to which they feel social pressure to respond in a particular way is present in most research of this type. However, because the majority of participants highly endorsed all achievement goals and had generally very positive self-concepts across all domains (**chapter IV, p.136**) social desirability may be a particularly relevant validity issue in this thesis. It may be that the participants wished to present themselves as highly motivated and this lead to the data not fitting the theoretical model. This adds to the need for caution when drawing the conclusion that the gifted and talented hold both performance and learning goals.

The selection of which achievement goals to examine is also an issue. Approach and avoidance goals were not measured as separate components of performance goals in this thesis and it is possible that this distinction may have emerged as important to the model. Theoretically it is probable that this sample hold performance-approach rather than performance-avoidance goals given their positive self-concepts with regard to their academic abilities (**chapter II, p.45**). Some of the literature suggests that only performance-avoidance goals have negative connotations for performance (e.g. Elliot & Church, 1997) and it may be that the gifted and talented are less likely to demonstrate the helpless response if indeed they do mainly pursue performance-approach goals. This thesis is limited

in that it has focussed only on three goal types. Greater nuance may have been drawn from data that explored multiple types of achievement goal.

Another limitation is a lack of ability to infer causation between the variables of the model. Though statistical associations are frequently reported in this thesis it is unclear how, or indeed if, the variables are influencing one another. The model assumes a certain directionality in which intelligence beliefs influence achievement goals which in turn influence academic performance. This linear relationship may be an over-simplification and it seems improbable that the relationship between variables is not more reciprocal or bi-directional, at least to a certain extent. It is important to avoid making causal assumptions when interpreting the data and to keep conclusions grounded in the limitations of the analysis. This thesis has attempted to avoid this pitfall as far as possible while not actively dismissing interpretations that appear ecologically valid.

Tied to this is an inability to confirm the stability of the variables measured by the model. Shim, Ryan & Anderson (2008) comment on the fluidity of achievement goals (**chapter II, p.54**), and it may be that theories of intelligence also show variability, or perhaps developmental trends, throughout the life course. This thesis makes an assumption that an individuals' theory of intelligence is stable but this may be inaccurate. In fact the complexity of the beliefs expressed during the email interviews (**chapters VI & VII**) suggest that participants' thinking may incorporate contextual factors that allow their theories of intelligence to be adaptable. This undermines the assumption of the model that intelligence beliefs are relatively stable and confirms a need for caution that limits how far the

questionnaire data can be interpreted. If the intelligence beliefs of the gifted and talented are contextual perhaps the model is applicable in certain contexts.

There were a number of limitations associated with the measurement of the key variables of the model. These are discussed in detail in **chapters II & III** but it is necessary to provide an overview here. Firstly, as previously discussed, the choice of goal measure (**chapter III, p.111**) placed certain limitations on the research and the exploration of a different set of achievement goals may have proven more enlightening. Though it is difficult to defend the selection of Grant & Dweck's (2003) measure it is also not easy to suggest a viable alternative given the range of options available. The choice of measure was based primarily on how suitable it was for the model being explored and only with hindsight can the decision be questioned. The realisation that the model does not apply to the gifted and talented shifted this study towards a more explorative emphasis and this may have benefitted from an achievement goal measure that incorporated more goal types.

Another limitation comes from how the different theories of intelligence were classified based on both Dweck's measure and the open qualitative question. The validity of Dweck's use of an incremental-entity continuum was challenged based on how the qualitative data suggested far more 'neither/both' classifications than Dweck's measure, suggesting that it failed to capture the complexity of gifted and talented student's theories of intelligence. However, the qualitative and qualitative questions naturally measure slightly different things and so it is arguable that comparing them is not valid. The qualitative question allowed participants to explore their ideas and this may encourage a complexity of thought that does not

occur in real-world situations. It may be that simple decisions based on generalized theories of intelligence are in fact more common in daily experience.

The measurement of academic achievement was also problematic. Simply examining GCSE grades in the manner of this thesis may lack the sensitivity necessary to identify small differences in performance. The use of raw scores may have been preferable as this may have reduced ceiling effects and increased the chances of the model detecting differences. Though these ceiling effects were problematic for nuanced analysis they do go some way towards confirming the high ability of the students that were sampled, providing evidence that they can be defined as gifted and talented. A similar issue was that the measurement of self-concept on a four-point Likert scale may not have given participants much opportunity to show variety in their attitudes. Though this measure has been shown to be reliable (Muijs, 1997a) and suitable for use with the gifted and talented it may have been beneficial to allow participants to express more variable views by including more points on the scale.

The sample and method for the interviews also enforce limitations on the conclusions of this thesis. The interviews provided usable data for only fourteen participants and so it is not possible to broadly generalize the findings to all gifted and talented adolescents. The themes drawn from the interviews are therefore not intended to provide an exhaustive taxonomy of theory of intelligence related factors or to generate an alternative theoretical model. Instead they provide a detailed insight into how a myriad of variables and processes may operate at the individual level and how these variables may inter-relate. Their analysis serves to

identify how these variables and processes may be important but does not suggest that they are always important.

Overall the general theoretical model underpinning this thesis has some limitations as does the methodology employed by this research. These limitations temper the conclusions that are drawn but they do not necessarily undermine them. Though they provide alternative explanations that cannot be empirically dismissed, on the whole these alternatives do not usually seem likely – arguably they lack the ecological validity of the main conclusions that are drawn. The epistemological framework which guides this thesis (**chapter I, p.24**) acknowledges the idea that when examining socially constructed concepts and human behaviour there are always going to be limitations when creating assumptions and universal laws. This thesis has generated findings that draw conclusions within these limitations while examining the core research questions from both micro and macro perspectives.

Implications

There are a number of possible implications for this research and this section discusses these in the context of the conclusions and limitations. There are two distinct types of implication: those that refer to possible follow-up studies that may clarify the model, elements of it or the role of theories of intelligence more broadly and those where the findings may inform educational policy and practice. Each of these types is now explored in turn.

The data appears to suggest that Dweck's model does not apply to gifted and talented adolescents and that this may be a result of their more complex intelligence beliefs and greater achievement motivation. Further research is needed to explore this further and to tackle some of the limitations of this interpretation. A key follow-up study would be one which compared a sample of gifted and talented students with a matched sample of non-gifted peers. This would be designed to ascertain whether the gifted sample is in fact different with regard to their theories of intelligence and goal orientations, as appears to be the case, or whether some other variable explains why the theoretical model could not account for this population. A direct comparison is a vital step for confirming the tentative conclusion that the gifted and talented do not fit within Dweck's theoretical framework because they operate unique motivational processes.

Another implication is the need for further studies featuring longitudinal designs. The model assumes that theory of intelligence and achievement goals are relatively stable but the age differences present in this study (see **chapter IV, p. 146**) and the literature that demonstrates shifts in achievement goal endorsement

over time (e.g. Shim, Ryan & Anderson, 2008) suggest that this assumption may be erroneous. A longitudinal study that follows gifted and talented adolescents and examines the change in the various components of the model over time could answer many of the questions about the stability and importance of theories of intelligence and achievement goals.

Follow-up studies such as the two outlined above need not be direct reconstructions of the methods used in this thesis. Though it is important to be able to directly compare research literature in order to build on knowledge and drive the field forward, this thesis is flawed and these flaws should be addressed in subsequent studies. For example, a single academic achievement measure that recorded raw assessment scores rather than just grades would be recommended so to remove ceiling effects as far as possible. In addition more sensitive measures for achievement goals that featured a greater range of possible responses could be used in an effort to draw out individual differences in attitudes to a greater degree.

Perhaps future studies would also benefit from performance-approach and performance-avoidance goal types being integrated into the design. Hong, Chiu, Dweck & Lin (1998) discuss a study in which they manipulated the intelligence beliefs of college students and found that entity theorists did not suffer from a helpless response if they believed they were still performing better than their peers and therefore not at risk of being perceived as ignorant. These students adopted a performance-approach goal but did not suffer from the negative connotations associated with performance goals (**chapter II, p.63**). Perhaps, in a similar way, the gifted and talented consider themselves as brighter than most of their peers

and so favour performance-approach over performance-avoidance goals. This could explain the association between high achievement and stronger entity beliefs in this thesis (**chapter IV, p.148**). More research is needed to ascertain whether performance-approach and avoidance goals play a role in the helpless behaviour and academic achievement of the gifted and talented.

In addition it would be interesting to explore the roles that other social and psychological factors play in moderating the achievement goals of the gifted and talented. Factors such as learned resourcefulness (Kennet & Keefer, 2006), self-efficacy (e.g. Elliot & Church, 1997) and attribution (e.g. Blackwell, Trzesniewski & Dweck, 2007) were not included in this study for practical reasons but may explain why the model did not apply to the gifted and talented. Some of the analysis of the email interviews suggested that Dweck's model could be adapted to the gifted and talented if theory of intelligence was reconceptualised as a measure of educational agency (**chapter VII, p.268**), suggesting that the model may just require some reconfiguration to suit the population. It would also be worth exploring socio-economic and ethnic differences with a stratified sample as these variables may prove to have a role in a larger model. Overall, an indirect implication of this study is that it has raised several questions about *why* the model does not apply to the gifted and talented and this opens up multiple avenues for further inquiry.

Finally the use of email interviews to gather qualitative data was a considerable success and so it is recommended that methods that operate through computer mediated communication should be more widely used. The goal of achieving a

richer and more nuanced understanding of the motivation of gifted and talented individuals (**chapter II, p.87**) was achieved through the use of these online interviews as participants generated their own data which was deep and contextual. Given the prevalence of IT in the lives of most adolescents it seems that further development of research methods that use computer mediated communication to overcome geographical, financial and practical restraints should be highly recommended.

The findings of this study also suggest some possible implications with regard to policy and practice for the gifted and talented, implications which are arguably practical and directly beneficial to adolescents in England. Bailey et al.'s (2008) review of interventions for improving the achievement of the gifted and talented stresses the need for more research with British students and also states that the current system of integrating personalised provision into the existing educational structure is proving to be effective. They suggest that:

Teachers and schools should be cautious about over-generalising, and of treating gifted and talented pupils as a homogeneous group. It is vital to be sensitive to individual needs and the mediating effects of the teacher, the curriculum and the classroom context. (p.2)

Bailey et al (2008) also state the importance of social settings and social skills for developing gifted and talented students' motivation:

Studies showed that enrichment programmes that help gifted and talented pupils develop self-regulation and higher order thinking skills had a positive effect on their achievement and engagement. (p.2)

It seems important that personalization is emphasised not just between students of different bands of ability but also within these bands, at the individual level.

This thesis certainly supports these notions and does so while providing some empirical evidence based on an English gifted and talented sample. The qualitative data in particular provides evidence that gifted and talented individuals have an array of personal attitudes, behaviours and needs that cannot be met through blanket policies that treat the population as a homogenous group. The participants interviewed in **chapters VI and VII** are arguably far more different from one another than they are similar. Though there was some evidence of perfectionism and social concerns about displaying too much ability in front of peers, there were also those who felt they were pragmatic and socially adjusted. Though there were trends with regard to which factors the participants listed as being important to their motivation, there were also differences – some aspired to a valued career, some wanted to make parents and teachers proud and others were motivated by competition and interaction with peers. Most were motivated by a variety of these to differing extents. This thesis supports the notion that gifted and talented educational policy should focus on personalization.

There are also implications to be taken from the manner in which the gifted and talented did not fit in with the theoretical model due to their generally very high endorsement of both performance and learning achievement goals (**chapter IV, p.135**). Based on this finding it is important that gifted and talented students remain engaged in school and offering opportunities for them to meet both of these goal types appears essential to this. The two goal types are of course closely

linked; learning is an essential part of achieving high performance, but there are some subtle differences in how each could be encouraged. Performance goals are naturally reinforced by the exam structure of the national curriculum but it is important that the gifted and talented also have their learning goals reinforced. The curriculum and teachers need to maintain some focus on learning for its own sake – divorced from the demands of assessment. The use of non-assessed coursework which is student lead and mildly competitive group projects could be useful for encouraging learning goals, though further research into such approaches is required.

In general theories of intelligence do not seem particularly influential for the achievement of the gifted and talented. Though a positive relationship was found between stronger entity theories and GCSE achievement (**chapter IV, p.150**) this may have occurred for a number of reasons and it does not suggest interventions to encourage an entity theory would be beneficial. The finding that gifted and talented students tend to have complex intelligence beliefs that incorporate entity and incremental elements suggests that intervention programs (such as those outlined in **chapter II, p.60**) would probably be ill-advised. The complexity of most gifted and talented student's beliefs about intelligence suggests that they are already adaptable and, in most cases, would not benefit from such interventions.

Linked with this is the issue of insufficient challenge for gifted and talented students and how this may lead to maladaptive behaviours. This thesis demonstrates how gifted and talented students can reach the ceiling of national assessments (**chapter III, p.125**) and there was also some evidence from the

email interviews that suggested that students who are used to achieving the highest grades with relative ease may be deterred by failure – effectively demonstrating a helpless response (**chapter VII, p.287**). Though the gifted and talented program was set up to provide challenging and enriching experiences it is possible that more could be done. All students require challenging but achievable work to remain motivated and perhaps the current system of assessment needs to be tiered in a more nuanced or personalized manner in order to provide the gifted and talented with this.

Finally, the interviews also raised some issues about the use of the term ‘gifted and talented’ and the impact of being identified as such. As one participant points out, the term ‘gifted’ is itself an entity word as it suggests you are endowed with high ability from birth (**chapter VII, p.280**). Another participant expressed concern about the impact on peers who were not identified as gifted and talented, giving an example of how this had caused a considerable loss of motivation and resultant underachievement in a friend (**chapter VII, p.300**). It seems apparent that care needs to be taken with the terminology used for policy. The word ‘gifted’ is loaded with social meaning and may encourage maladaptive entity beliefs which undermine the importance of hard work in those identified as belonging to the category and perhaps causing de-motivation and underachievement in those not identified. This thesis suggests that the terminology may benefit from a review such that alternative terms that are less value loaded may be considered. Categorizing students by ability may be necessary for helping each student reach their potential but this process must be carried out in a sensitive and well informed way.

A final thought

The inception of this thesis is based on the comments of one gifted and talented student regarding his belief that he was not clever but simply hard working.

Examining theories of intelligence and the idea that people either fall into incremental or entity categories provided an elegant explanation for the role of intelligence beliefs in dictating actual academic achievement but with regard to the gifted and talented it has proven an over-simplification. The reality was that the sample's theories of intelligence were much richer and more complex:

I think we are born with a certain disposition to intelligence, and it is the environment and the effort a person puts in that determines the extent to which it is fulfilled. I believe I must have been born with some kind of ability, because I've never seemed to have had to work as hard as others have in order to achieve similar results. However, this isn't to say that I haven't worked hard and that, to some extent, I have controlled my environment through the friends I made and the sort of life I have lived.

As Anna's above statement suggests, there are so many factors that act upon and from within a student that dictate their achievement that each individual will be governed by a largely unique interaction of a multitude of biological, psychological, social and environmental factors. This thesis, though begun on the basis of a fairly rigid theoretical framework, has emerged as largely explorative. The findings emphasise the complexity of achievement and how a broad scope that encompasses a large number of variables is required to gain an accurate insight. This is not as discouraging as it may appear. Individual variables, such as theories of intelligence and achievement goals, can be explored and perhaps

manipulated to reach positive practical objectives. However, this can only be achieved with a perspective that acknowledges the complexity and contextual nature of motivation and achievement.

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Appendix A: Final version of postal questionnaire

Motivation and goals questionnaire

This questionnaire is designed to explore your beliefs and attitudes about school and motivation. Please fill it in as accurately and truthfully as possible so that we may gain the best possible understanding for our research.

A. Academic Achievement

Please provide details of your previous academic achievement. You may have only completed up to Key Stage 2. If this is the case please leave any irrelevant columns blank. The GCSE section allows you to fill in the subjects completed and grades for up to 14 GCSEs, please fill in the name of each subject you took (e.g. Maths, Geography, etc.) and the grade you attained. If you have completed more than 14 GCSEs please fill in your best 14 results.

Key Stage 2 Exams (usually taken in Year 6)

Subject	Level Attained
English	
Mathematics	
Science	

GCSE Exams (usually taken in Year 11)

Subject	Grade	Subject	Grade

B. About your attitudes and goals

Please tick the box that best corresponds with your attitude towards each statement

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
1) It is very important to do well in my courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) In my classes I focus on developing my abilities and acquiring new ones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) It is important for me to be able to confirm my intelligence through my schoolwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) I strive to constantly learn and improve in my courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) I try to do better in my classes than other students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) One of my important goals is to validate my intelligence through my schoolwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) I really enjoy facing challenges, and I seek out opportunities to do so in my courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) I seek out courses that I will find challenging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) I really want to get good grades in my classes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) In school I am always seeking opportunities to develop new skills and acquire new knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11) It is very important to me to confirm that I am more intelligent than other students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) It is very important to me to do well in my courses compared to others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) A major goal I have in my courses is to perform really well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) In school I am focussed on demonstrating my intellectual ability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15) A major goal I have in my courses is to get higher grades than the other students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) It is very important to me to feel that my coursework offers me real challenges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) When I take a course in school, it is very important for me to validate that I am smarter than other students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18) In school I am focussed on demonstrating that I am smarter than other students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. About your intelligence beliefs

Please tick the box that best corresponds with your attitude towards each statement

	Strongly Disagree	Disagree	Mostly Disagree	Mostly Agree	Agree	Strongly Agree
1) You have a certain amount of intelligence, and you can't really do much to change it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Your intelligence is something about you that you can't change very much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) You can learn new things but, but you can't really change your basic intelligence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) No matter who you are, you can change your intelligence a lot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) You can always directly change how intelligent you are	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) No matter how much intelligence you have, you can always change it quite a bit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. About you

Please tick the box that best corresponds with your attitude towards each statement. Some of the questions are about Maths and English, if you no longer study these subjects please think back to when you did and answer as best you can.

	Agree Strongly	Agree Somewhat	Disagree Somewhat	Disagree Strongly
1) My teachers think I'm good at maths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) I would like to be someone else	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) I'm good looking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) I get good grades in all subjects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) I often don't understand English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) I have a lot of fun with my parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) I get good marks in maths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) I don't like my body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) Other students like me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10) I'd change a lot about myself if I could	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) My teachers think I'm good at English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) I'm bad at sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) I'm happy with the way I live my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) I've got an attractive face	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15) My teachers think I'm clever	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) My parents are easy to talk to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) I often don't understand maths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18) I find it easy to make friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19) I'm one of the best in my class at English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20) I enjoy doing sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21) I often don't understand things at school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22) I'm glad to be me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23) I don't like spending time with my parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24) Other students want me to be their friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25) I'm one of the best in my class at maths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26) I'm not good at sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27) I often think I'm worthless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28) I get good marks in English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29) I'm one of the best in my class at all subjects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30) I've got a lot to be proud of	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31) I don't like the way I look	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32) I don't have many friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E. About what motivates you

Please write a few sentences about the type of things that motivate you to work hard at school:

Please write a few sentences about the type of things that put you off working hard at school:

Please write a few sentences about what you understand by the term 'intelligence' and where you think intelligence comes from:

Thank you very much for your time!

The research team would like to find out more about your views on motivation and goals.

If you would be interested in taking part in an interview on this topic please tick the box and provide an email address.

☐ _____

Appendix B: T-test statistics for relationships between self concepts and both gender and age group.

Self-concept	Male mean	Female mean	<i>t</i>	df	<i>p</i>
Self-esteem	20.67	20.34	.971	390	.332
Academic	13.50	13.20	1.40	394	.162
Maths	14.44	13.25	5.09	390	<.001
English	13.22	13.31	-.320	394	.750
Parental	9.80	10.16	-1.84	391	.067
Peer	12.94	12.73	.932	380	.352
Physical	10.11	8.78	5.44	393	<.001
Body image	11.87	11.29	2.14	379	.033

Self-concept	11-12 years mean	16-17 years mean	<i>t</i>	df	<i>p</i>
Self-esteem	20.92	19.69	3.41	284	.001
Academic	13.33	13.26	.35	409	.727
Maths	14.01	13.39	2.43	301	.016
English	13.46	12.91	2.15	409	.034
Parental	10.35	9.48	4.46	293	<.001
Peer	13.06	12.46	2.65	395	.008
Physical	9.67	8.84	3.26	413	.001
Body image	11.78	11.16	2.30	393	.022

Note: The T-tests were corrected for homogeneity of variance where in violation of Levene's test.

Appendix C: Email interview questions

We are conducting this survey to find out more about your beliefs and attitudes.

There are no right or wrong answers, we would like you to think about your answers and be as honest as possible. We would like your opinion rather than what you think others may answer. All responses will be entirely confidential; nobody other than the researcher will know your identity and any reports will preserve your anonymity completely. Please answer the following questions as fully as possible, taking as much space as you need.

1. Please write a little about how you would personally define the term ‘intelligence’.
2. What does it mean for a person to be ‘intelligent’? Please give an example of someone you consider to be intelligent and explain why you believe them to be intelligent.
3. Do you believe that ‘intelligence’ is something that people are born with or something that has to be worked for? Please explain your answer.
4. At school, is it possible to be naturally intelligent in some subjects but not others? Please use examples to illustrate your answers.

5. Can you give an example of a situation in which you have done better or worse than you expected on an exam, a test or a piece of coursework?
What do you think were the causes of this?
6. There is a body of research that suggests that most people fall in to one of two categories. They either believe that a) intelligence is fixed at birth (genetic) and stable throughout their life or b) intelligence can change, for better or worse, due to environmental factors and how much effort a person puts towards learning. What do you think of this theory, and how would you say it applied to you, if at all?

Thank you very much for taking the time to answer these questions. I look forward to reading your thoughts and incorporating them in to my research.

Many thanks,

Stuart Cadwallader, Institute of Education, University of Warwick